ELECTRICAL REVIEW

and WESTERN ELECTRICIAN with which is consolidated ELECTROCRAFT

VOL. LXV, No. 10. CHICAGO, SATURDAY, SEPTEMBER 5, 1914. ISSUED WEEKLY.

COMPRISING

ELECTRICAL REVIEW WESTERN ELECTRICIAN ELECTROCRAFT

ELECTRICAL REVIEW PUBLISHING COMPANY, INC.

608 SOUTH DEARBORN STREET

CHICAGO

Charles W. Price, President and Treasurer.
A. A. Gray, General Manager. H. S. Tuthill, Business Manager.
C. W. Forbrich, Assistant Business Manager.

E. E. Wood . . . . . 13 Park Row, New York, N. Y.
Manager Eastern States.
J. B. McCarthy . . . . . Detroit, Mich.
Manager Middle States.
C. W. Forbrich . . . . . Chicago, Ill.
Manager Western States.

ELECTRICAL REVIEW AND WESTERN ELECTRICIAN

Charles W. Price.....Editor-in-Chief
A. A. Gray.....Managing Editor
Morton Githens Lloyd.....Technical Editor
F. H. Bernhard.....Associate Editor
Howard Ehrlich .....Associate Editor
Chester A. Gauss.....Assistant Editor

MEMBER SERVICE THE SOCIETY FOR ELECTRICAL DEVELOPMENT INC. SAFETY DO IT ELECTRICALLY

SUBSCRIPTIONS.

One Year, United States $3.00
One Year, Canada 4.00
One Year, Foreign Countries 6.00
Single Copy, 10 cents. Back one month, each.. .25

Entered as second-class matter, November 7, 1908, at the Post Office at Chicago, Ill., under the Act of March 3, 1879

CONTENTS.

EDITORIALS:
The Outlook 449
The Lincoln Highway 450
English Electrical Engineers and the War 450
"Electrical Engineering Problems" 451
DEPARTMENTS:
Electrical Engineering Problems 473
Commercial Practice 474
Electric Sign Data 476
Electrical Construction 477
National Association of Electrical Inspectors 480
Public Service Commissions 482
New Electrical and Mechanical Appliances 483
Current Electrical News 489
Record of Electrical Patents 494
Electric Vehicle Section 497
THE OUTLOOK:
The Electrical Trade from the Supply Jobbers' Viewpoint. 461
The Electrical Trade from the Manufacturers' Viewpoint.. 463
The Electrical Trade from the Publishers' Standpoint.... 464
LEADING ARTICLES:
Installations of Tube Lighting in London 455
Electric Lighting in the British Museum.—By W. B. Conant 456
The Trend of the Lighting Business.—By M. C. Turpin.... 457
Analysis of Germany's Electrical Export Trade..... 470
British Electrical Trade; War Effect.—By Albert H. Bridge 472
Terminating and Lighting-Protection Arrangements for a Heavy Conductor Run.—By Arthur O'Brien 477
MISCELLANEOUS:
Program for Convention of Pennsylvania Electric Association 452
Meeting of Nevada Electrical Association 452
Electric Floats in Wasatch Pageant 452
Convention of the Illuminating Engineering Society 452
Sir John Snell 453
Further Safety Propaganda Needed..... 454
Annual Convention of Massachusetts' Contractors 454
Central-Station Practice and Experience with Gas-Filled Tungsten Lamps 460
Electric Signs and the National Advertiser..... 474
Unusual Power Development in Wichita 475
Walsenburg Electric Show 475
Among the Contractors 479
Buffalo Electric Vehicle Company Exhibits New 1915 Model 497
Electric Vehicle Association of America 498

Copyright, 1914, by Electrical Review Publishing Company, Inc.

THE OUTLOOK.

On other pages of this issue we publish a comprehensive survey of the business conditions in the electrical industry. From the viewpoints of the electrical supply jobber and the manufacturer of electrical apparatus the situation is such as to give cause for apprehension. From the viewpoint of the manufacturer of other lines of goods, from textiles to timber, there is a hardy note of optimism that augers well for the future. The editors of the leading business publications of the United States have generously and graciously contributed their opinions with regard to the outlook in their respective industries. It is hoped that electrical manufacturers and jobbers of electrical supplies will read these contributions. We, in the electrical industry, are wont to look inside too much. The attitude of the central station is watched very closely and the policy of activity or retrenchment, as the case may be, is too often made the barometer of our industrial electrical business conditions. It is true that the electrical industry is busy when central stations are aggressively pushing their extensions, rehabilitating old properties and establishing new developments. It is also true that the electric light and power industry, so far as new development is concerned, is just at present quite inactive. There can be no doubt of the result of this condition. Manufacturers of electrical material are witnessing a dearth of inquiries and something must be done to remedy the situation. There is much to be done and fortunately for the electrical industry the growing popularity of the electric drive, the demand for more and better lighting finds the manufacturers in other industries disposed to make considerable sacrifices in order that the benefits and economies of electric service may be secured. There are available enormous possibilities for the installation of electrical equipment in thousands of industrial applications. Practically every industry is dependent for economy and good production upon electrical service and equipment of some sort. The electrical manufacturer can assist the central station to develop these industries, and it is along these lines of intensive cultivation of industrial adaptations that an almost undiscovered market lies ready for conquest. One of the biggest electrical supply houses in the middle west has within the past three or four years lost practically all of its central-station business due to the syndicating of hundreds

of small power plants and centralizing of power supply. The same territory, however, is yielding a greater volume of business today than ever before, and this business is coming entirely from the electrical contractors and from shops and factories requiring electrical equipment. By going out aggressively after this business, by assisting the electrical contractor and working with the commercial departments of the central stations, the manufacturer of electrical equipment and the electrical supply jobber will not only be bulwarks in their own defense and give effectual assistance to the central stations at a time when wisdom indicates conserving their financial resources, but they will develop a demand for electrical equipment in the various industries that will astonish even the most sanguine by its extent and its profit-producing possibilities.

THE LINCOLN HIGHWAY.

The project for a transcontinental highway connecting New York and San Francisco to be known as the Lincoln Memorial Highway has been making steady progress for some time and it is hoped to have it completed next year. This would be desirable from many points of view, especially as it would invite travel for many motorists to the Panama-Pacific International Exposition.

In giving attention to this project, local communities should have in mind more than the mere surfacing of the road which has been chosen as a link for the Lincoln Highway. To make this a model of achievement in interurban and interstate traffic other things must be considered besides roadbed and surfacing. Prominent among these is the lighting of the highway at night. Of course, the only illuminant suitable for such a purpose is the electric current, and the many examples of rural road lighting already in existence show that it would be entirely feasible to light this transcontinental highway from end to end. To achieve this result, however, it will be necessary for each local community to do its part. A good example has been set in Ada, O., where the Business Men's Club proposes to spend the money necessary for equipping the highway with lamps, providing the city will operate and maintain them.

Another electrical convenience that might be supplied along such a highway would be telephone service from slot instruments which could be erected at suitable intervals and connected to the nearest local exchange. Service of this kind would be of great value in emergencies, and as travel becomes more dense, sufficient use of them would no doubt be made by motorists and others to pay for the cost.

Now that the electric vehicle has developed into a roadster and touring machine, the Lincoln Highway will no doubt be traveled by many cars of this class and those interested in the development and greater use of these vehicles should lend their influence in aiding the completion of the highway project. There is no better time for pushing improvements of this kind than when business is lagging and many men are out of employment. The curtailment of foreign trade is likely to reduce the prices on such structural materials as are needed in highway work, as steel for bridges, etc. The greatest expense, however, in road building is for the labor involved, and this can be most advantageously secured during dull times. It is better to spend money in providing work than in taking care of those whose means of support have been taken away, and aside from this an investment in good roads is a good investment for any community.

ENGLISH ELECTRICAL ENGINEERS AND THE WAR.

Within a very brief space of time after England had sent her ultimatum to Germany, electrical men in the United Kingdom were showing a restlessness for getting to work in the defence of their country. Ever since the late Dr. John Hopkinson took steps for the organization of London Electrical Volunteers, prior to the Boer war, and since the valuable service rendered by them in that war, a fine body of men has been in practically continuous training, and the doings of the London division have long formed one of the regular weekly features in the electrical press. But this present emergency brought such a wave of patriotism as England has never before witnessed, and there was a response received from electrical men, not connected with the Electrical Engineers already organized, in all parts of the Kingdom when the call for help came.

It is safe to assume that in this fearful war more extensive use is being made of electricity than in any previous war. If we consider the record of the nations concerned in it in electrical and other scientific application we are at once justified in making such an assumption. In field telegraphy and telephony, in wireless telegraphy, in searchlight projection, in electrical service of manifold kinds in battleships, cruisers, destroyers, submarines, etc.; in X-ray and ambulance work, there have been big advances since any of the great powers last found themselves at war, and though as a matter of policy the details of these advances have been kept secret to a remarkable extent, we have reason to suppose that the utmost assistance has been obtained therefrom by those responsible for the various operations both on land and on sea.

The secret of success in assisting in national emergency lies in the efficient organization of the available forces so that the specialist's services can be utilized to the full limit of their value. In many parts of England when hundreds of thousands of men and women were coming forward anxious to help in some way or other a check had to be administered by showing that to be either a good soldier or a good nurse something more was necessary than good will, and that something is here fitness and there training. The dainty lady who desired to be a missionary in fashionable Paris rather than a helper in the slums of her own polluted city

may be called to mind. A great wave of emotion is bound to carry with it many who when their resolves are analyzed have little more than a sentimental desire to help. Now electrical engineers are hardly the type to be carried away like that. They know the special character of their training and that it has taken them years to get to a point of sufficient efficiency and in very large numbers calmly signified their intention to place themselves in readiness to do as the nation required of them. The Institution of Electrical Engineers with most commendable promptitude took suitable measures for feeling the pulse of its members and preparing classified lists of those whose services were offered. The Council pointed out that members could either (1) place their services as electrical engineers at the disposal of the War Office and the Admiralty; or (2) be in readiness to fill vacancies in public services, electric power stations, tramways, railways, etc., caused by the calling up of the Reserves and the Territorial Forces. The classified lists of such men were intended to show at a glance the suitability of men for particular occupations, and inasmuch as it is recognized that the Institution has not a monopoly of useful practical electrical men whose services might be of value in such a connection, the list was not limited to members of that organization, but was open to any qualified men who could act in the capacities named.

It need hardly be stated that the English electrical profession and industry has also been drawn upon to a considerable extent by technical and commercial electrical men being called up to join the forces in a fighting rather than an electrical capacity. Many electrical engineers, managers of electrical businesses, workers on electric supply and tramway and railway systems, have left their peaceable occupations. It is understood that generally speaking British electrical manufactories have sent from five to ten per cent of their employees to the front, and as an example of the part played by tramway workers it may be mentioned that the Glasgow municipal tramway department has had 800 men called up.

An urgent appeal was made by the Royal Flying Corps, Military Wing, calling for the special enlistment, for one year or for the duration of the war, of many classes of tradesmen at pay varying according to trade, from four shillings to seven shillings and six pence per day, all found. Among those urgently required here were cable-joiners, drillers, dynamo attendants, electric bell fitters, electricians, engine testers, instrument repairers, switchboard attendants, wiremen, and wireless operators. Men were also wanted who had had general mechanical engineering workshop experience and possessed a good general motor engineering knowledge and a thorough knowledge of the principles of magneto and coil ignition and who were able to make intelligible sketches of machinery details and rough calculations connected therewith.

Another published announcement called for wireless telegraph operators to enroll in the Royal Naval Reserve for service in the British Fleet. This call has been a particularly popular one.

Every possible measure was taken to prevent the withdrawal of men for active service from affecting the activity of the British electrical engineering industries and beyond the preferential handling of government emergency business little interference was anticipated. Certain lines of electrical manufactures had been obtained more or less extensively from Germany and some from France and Austria, but British firms anticipate handling much of the German and Austrian business at home in future for obvious reasons. In such respects there may be some inconvenience and temporarily at least—perhaps permanently—American electrical firms should find a better market too, in the British Isles, as they have already foreseen.

The volume of British electrical exports has not been quite so large lately as it was a short time ago, so perhaps they have not of late been, in some departments, turning out material and apparatus to the full extent of their capacity, though the local electrical demand has been brisk and some big contracts have been in progress for Colonial markets. It is however perhaps unwise to speculate further on such points, for the days of the conflict are young as yet.

"ELECTRICAL ENGINEERING PROBLEMS."

Beginning with this issue there will be published a series of articles entitled "Electrical Engineering Problems." The joint authors, Messrs. R. G. Hudson and W. V. Lyon, have worked out a method of presenting these problems with their solutions so that no matter what degree of training the student may have had the series will be found of interest and value. To the tyro in electrical engineering these problems and their solutions will establish many new viewpoints and help materially in the mastery of the details involved in a study of the principles underlying the manifestations of electrical phenomena. To the practicing engineer the problems will prove a valuable check on past reasearch and present experience.

Mr. Ralph G. Hudson is a graduate Bachelor of Science in Electrical Engineering from the Massachusetts Institute of Technology. He has been assistant in the standardizing laboratory, and for the past five years has been instructor of electrical engineering at Massachusetts Tech. He is the author of the "Problems" in Pender's "Principles of Electrical Engineering," and associate editor of the "American Electrical Engineers Handbook." Mr. Waldo V. Lyon is a graduate of the department of electrical engineering of the Massachusetts Institute of Technology, has served as assistant, and since 1908 has been instructor in electrical engineering at that institution. He is one of the joint authors of "Problems in Electrical Engineering," also the answers to these problems and of "Problems in Alternating Current Machinery."

Program for Convention of Pennsylvania Electric Association.

As previously announced in these columns, the seventh annual convention of the Pennsylvania Electric Association, state branch of the National Electric Light Association, will be held at Forest Inn, Eagle's Mere, Pa., September 8, 9, 10 and 11.

The convention will be formally opened on Tuesday evening by a reception to President Duncan T. Campbell, of Scranton, Pa. Business sessions will start Wednesday at 10 a m. The program of papers and the reports includes in addition to the purely association business matters, a report of the Accounting Committee, by H. R. Kern; report of the Safety and Welfare Committee, by Henry Harris, and discussion of the Question Box.

The program for Thursday morning includes a paper entitled, "Interurban Lighting," by R. W. Hoy; report of the Lamp Committee, by H. L. Fullerton; a paper entitled, "Requirements of the Public Service Commission Covering Meter Testing and Voltage Regulation," by H. S. Tyson; an address by Prof. L. H. Harris, consulting engineer for the Public Service Commission of Pennsylvania, and an address by H. H. Scott, president of the National Electric Light Association.

An executive session will be held Thursday afternoon at which the report of the Public Utility Interconstruction Committee will be presented by E. H. Davis, and an address will be delivered by Frederick W. Fleitz.

The program for Friday morning's session includes a paper entitled, "Securing the Small Residence Business," by E. W. Osborn, and a paper entitled, "Flat-Rate Meters for Heating and Lighting Loads," by H. F. Hatch, and a paper entitled, "Insulator Designs in Relation to Lighting and Other Static Disturbances," by J. S. Wise. Reports of the Auditing, Nominating and Resolutions Committees will also be presented at this session.

The entertainment features provide for numerous athletic events, dancing, vaudeville and musicales. Stephen C. Pohe, of Bloomsburg, Pa., is secretary of the Association.

Meeting of Nevada Electrical Association.

The Nevada Electrical Association will meet at the State University, Reno, Nev., on September 7. Among the papers to be presented are: "The Beowawe Locomobile Plant," by A. N. Voss; "Electrical Control," by E. P. Cullinan; "Drying Out Wet Motors," by J. K. Poe; "The Edison Storage Battery," by E. M. Cutting; "The Gas-Filled Lamp," by A. G. Jones.

Electric Floats in Wasatch Pageant.

Electricity played a prominent part in the celebration of the annual carnival of the Wizard of the Wasatch in Salt Lake City, Utah, August 25 to 29, the principal feature of which was the electrical pageant which was given on the evening of the 25th and repeated again on the 28th. The 16 floats in this parade were designed by and constructed directly by Miss Emma L. Mulkey, of San Francisco, and represented themes in poetry, songs and stories. The principal ones were constructed on motor-equipped flat cars furnished by the Utah Light & Railway Company and these traveling under their own power along the route of the parade were unusually effective, particularly those representing boats. Over 5,000 lamps were used in producing the effects desired and these were mostly concealed in coves and the light reflected against the face of the floats, thus producing beautiful effects in lights and shades without the presence of exposed lamps.

The following were the themes of the floats: Columbia, Old King Cole, Rocked in the Cradle of the Deep, Old Heidelberg, the Old Woman Who Lived in the Shoe, Robinson Crusoe, Alice in Wonderland, Cleopatra, the Arabian Knights, the "Funnies," Madam Butterfly, Mother Goose, Hiawatha, and the Wizard of the Wasatch.

In the industrial parade on Wednesday, the Utah Light & Railway Company entered a float in the electric truck division representing Jupiter with thunderbolt in hand in the foreground and Benjamin Franklin drawing lightning from the skies with his kite in the background.

Annual Convention of Kansas Association.

The annual convention of the Kansas Gas, Water, Electric Light and Street Railway Association will be held in Arkansas City, Kans., on October 22, 23 and 24.

Outing of Utility Employees.

The Western Gas & Electric Company gave an outing to its employees on August 26 at Fox River Park, Aurora, Ill. More than 650 employees attended from points in Kane, Kendall, Will, DuPage, McHenry and DeKalb counties. A ball game between employees of Elgin and Joliet was a feature, Joliet winning by a score of 13 to 0.

Argentina as an Electrical Market.

The importation of electrical supplies in Argentina for the first three months of the year amounted to $2,467,292, an increase over the corresponding period of 1913 of $116,271.

Convention of the Illuminating Engineering Society.

The eighth annual convention of the Illuminating Engineering Society, to be held at Cleveland, O., September 21 to 25, promises to be the most interesting yet held by that society.

In addition to the papers mentioned in the issue of August 22, the following have been placed upon the program: "The Color of Illuminants," by L. A. Jones; "The Visibility of Radiation," by P. G. Nutting; "Mixed Specular and Diffuse Reflection," by P. G. Nutting; "Some Tests of Possible Standards for Reflecting Power," by Jones, Nutting and Elliott; "Further Experiments on the Efficiency of the Eye Under Different Conditions of Lighting," by C. E. Ferree and G. Rand; "Characteristic Equations of Tungsten Lamps and Their Application in Heterochromatic Photometry," by G. W. Middlekauff and J. F. Skogland; "Diffusing Glass for Translucent Ceiling Lighting," by E. J. Edwards; "Recent Improvements in Incandescent Gas Lighting," by R. F. Pierce.

There will be a lecture session at which the following addresses will be presented: "Color Photography," by M. C. Rypinski; "Photo-Sculpturing and the Use of Light in the Reproduction and Illumination of Sculpture," by J. Hammond Smith.

The Convention Committee has been busy making arrangements for the convention since June 17, when the first meeting of the committee was held at the Hotel Statler, where Chairman W. M. Skiff gave a luncheon to the chairmen of the various sub-committees. The chairmen of the various committees are as follows: Attendance Committee, H. B. Dates; Publicity Committee, F. R. Hutchinson; Reception Committee, E. P. Hyde; Entertainment Committee, C. T. McKinstry; Hotel Committee, A. G. Summerell; Finance Committee, Mathias Turner; Master of Transportation, H. N. Sibbald. A special car will be run from Chicago and special arrangements for transportation from other points will be made.

Headquarters will be at the Hollenden Hotel and those contemplating attendance should communicate directly with the hotel management.

Arrangements have been made for a number of entertainment features including a reception and ball on Monday evening; banquet on Wednesday evening at which Charles F. Brush will speak; entertainment at Nela Park on Thursday afternoon and evening and various diversions for the ladies during convention sessions. The secretary of the General Convention Committee is Browne Harding, National Lamp Works, Cleveland, O.

Sir John Snell.

John Francis Claverton Snell—Sir John Snell, as he is now popularly known in England since King George last June conferred the honor of knighthood upon him at Saint James's Palace—is president-elect of the Institution of Electrical Engineers. He will assume control of the reins of that important organization from October 1, next, and many engineers interested in the future of the leading British electrical institution are wondering whether the new presidential year will witness any development of industrial policy which shall silence the critics. In the recent discussions which followed upon the retirement of the Industrial Committee, it has been revealed that both among members of the Institution Council and in the rank and file of the membership there is a marked difference of opinion as to how far it is wise or possible for such an institution to concern itself with some trade and industrial matters that it is asked to handle. One section appears to hold that it would be wrong to deal with questions which might bring it into conflict with the interests of a section of the members who support it; another says that sectional interests should be subordinated to the interests of the whole body. It is at a time when there is this division in the ranks and in the Council that Sir John Snell comes to the presidential chair. If he can bring temporary peace he will deserve well of the entire body; if he can somehow influence his council so that the controversy will be settled once and for all, he will deserve far better.

Sir John Snell,
President-Elect of the Institution of Electrical Engineers.

Sir John approaches the chair when his country, indeed most of Europe is at war, and the Institution through its members will play, according to present indications, an important part in this terrible conflict of modernly equipped forces both on land and on sea. But for the circumstance of weak sight Sir John would himself be in His Majesty's navy today. He is a son of the late Lieutenant Snell, R. N., and was educated at Plymouth Grammar School for Naval Cadetship. The Institution of Electrical Engineers has promptly undertaken the organization of electrical men who desire to assist their nation in its hour of need, and much may be heard of their valuable specialized service during the war.

After completion of his education at King's College, London, John Snell began his electrical training with the once well known firm of Woodhouse & Rawson, at Cadby Hall, Kensington, becoming subsequently their leading draftsman. As assistant engineer on Colonel Crompton's staff later he was engaged in laying mains for the Kensington and Notting Hill Electric Lighting Companies in London, and for the Stockholms Electricitatsverket, Sweden. He then became chief assistant to the late Major-General Webber, R. E., C. B., consulting engineer, and was engaged upon the preparation of several big schemes such as a projected tube railway from Paddington to Clapham Junction, London, the electricity supply of Funchal, Madiera and others. Less than three years were occupied in this association, for he was offered the post (by Prof. Henry Robinson) of resident engineer to the Saint Pancras, London, local authority, and under Professor Robinson he built the King's Road electricity and destructor station. He next became borough electrical engineer at Sunderland when that place had but one small station of 500 kilowatts. During his years there he considerably enlarged the old station, built a new three-phase station, and developed the undertaking to an installed capacity of 10,000 kilowatts. He inaugurated the three-phase supply to the local shipyards, engineworks, mills and docks. He was also appointed borough tramways engineer in addition to his other post and was responsible for the tramways electrification and the subsequent management of the system for a time.

When he left Sunderland in 1906 (continuing to act as consultant to the borough) he began practice as a consulting engineer at Westminster, in partnership with Stuart S. Moore-Ede. Mr. Snell acted in 1906 and 1907 as one of the electrical advisers to the London County Council in respect to the Parliamentary bills for the electricity supply of London. He was appointed consulting electrical engineer to the Buenos Aires & Pacific Railway in 1907, and built a large power station at Bahia Blanca, Argentina, and electrified the company's docks and railway workshop, the town tramway, and the general supply of that city. He also acted for the London County Council in the Westminster Improvements arbitration and in the London United Tramways arbitration, and was also one of the two expert advisers to His Majesty's Home Office in the framing of the Factory and Workshops Electrical Regulations. In 1910, on the death of Major Cardew, Mr. Snell was offered by the late Sir Willam Preece a partnership in the consulting firm of Preece & Cardew, which he accepted. The firm became Preece, Cardew & Snell, who are electrical advisers to the Crown Agents for the Colonies, the Union of South Africa, the Dominion of New Zealand, the municipalities of Sydney (New South Wales), Auckland and Wellington (New Zealand), Shanghai, La Plata and many other places in England and abroad.

Sir John Snell was selected to act as the leading expert for the Crown in the National Telephone arbitration, proceedings of almost unparalleled length and complexity. The claim of the company was laid at 21 millions of pounds sterling and the award of the court was 12,250,000 sterling—within a quarter of a million of his valuation.

Sir John Snell, who is 45 years of age, has had a very active experience in connection with many engineering and scientific societies. At different

periods he has been vice-president of the Newcastle Local Section of the Civil Engineers, chairman of the Newcastle Local Section of the Institution of Electrical Engineers, and president of the Incorporated Municipal Electrical Association. He is a member of the British association and the Royal Institution; a Fellow of the American Institute of Electrical Engineers, and of the Geological Society. He is chairman of the Sectional Electrical Committee of the British Engineering Standards Committee.

Sir John is a recognized authority both on power-house design and electrical distribution, and has written well-known books on both subjects.

It is understood that the honor of knighthood was chiefly intended as recognition for his services rendered to the State in connection with the purchase of the telephone system, but the above account of a varied and distinguished career will show him to be possessed of qualifications fully meriting the distinction as well as of experience well fitting him to preside over the proceedings of the next session of the Institution of Electrical Engineers with becoming tact and grace.

Summer Course for Engineering Teachers at Westinghouse Shops.

Following a custom adopted four years ago, the Westinghouse Electric & Manufacturing Company has had at its East Pittsburgh works this summer a number of college professors and instructors, engaged in regular shop and engineering work.

This course was the result of a conference held at a meeting of the Society for the Promotion of Engineering Education in Pittsburgh in the summer of 1911. At that time a number of college professors were invited to spend a portion of their vacation at the East Pittsburgh works and so become more familiar with actual working conditions in the manufacture of electrical apparatus. So successful was the scheme which was tried out by a number of professors that the following year regular employment was opened to a number of engineering teachers.

This year circumstances made it necessary to postpone the beginning of the course from the date originally set, which had the effect of lessening the attendance, because a number of the teachers had made other plans for the summer. Eighteen educators took up the work this year, which continued from July 13 to August 15.

These teachers were treated just the same as the regular shop employees, and therefore had an excellent chance to gain practical first-hand information on the building of electrical apparatus.

Further Safety Propaganda Needed.

The two following reports of fatal electrical accidents to boys show that repeated warnings in the public press, in the schools and at home must be given to boys and adventurous youths to keep off poles or towers carrying electric wires and to refrain from touching dangling wires that may have been loosened by storm or other cause.

Clive Singleton, a lad 17 years of age, was recently killed on one of the steel towers of the Utah Light & Railway Company near its receiving substation on the Jordan River in the western part of Salt Lake City, Utah. Young Singleton, with four companions, had been swimming in the river. He dressed before the rest and declared he was going to climb the tower. His companions warned him of the danger of doing this but he persisted and a few moments later they were startled by a blinding flash and the boy fell to the ground, being killed instantly by the 40,000-volt current which passed through his body. The entire street-railway and power traffic of Salt Lake City was interrupted by the accident.

A nine-year-old boy by the name of McArthur living between Ashton and Chester in Fremont County, Idaho, was instantly killed on August 25 by an electric shock from a high-tension wire on the power line of the Utah Power & Light Company. The boy, in company with others, was playing with a guy wire swinging loose from a pole 55 feet high when the loose wire came in contact with the high-tension line wire, sending 11,000 volts through the body of the unfortunate boy and causing instant death.

Patent Office Wants Manufacturers' Catalogs.

The United States Patent Office, Washington, D. C., announces that it would be pleased to receive from manufacturers and publishers such catalogs, circulars, price-lists, or other advertisements relating to the sciences and mechanical arts as are published by them for gratuitous distribution. It is requested that at least three copies of such publications be forwarded in order that the subjects may be properly indexed, classified, and subclassified in the Scientific Library of the Patent Office for convenient and ready reference.

Bluish Lamps for Work on Blue Linen.

Incandescent and electric lamp bulbs colored a light tint of blue are installed over the cutters' benches in the workroom of Robinson & Cleaver, linen manufacturers, Belfast, Ireland, where blue linen or drilling is being cut to pattern for manufacture into garments.

The tint of the lamps corresponds to that of the cloth, and renders the work over that material less taxing to the eyesight of employees.

Annual Convention of Massachusetts Contractors

It has been decided to hold the annual convention of the Electrical Contractors' Association of Massachusetts on September 23 and 24 at Worcester. In conjunction with it there will be a convention of all electrical interests of New England. The Convention Committee consists of W. K. Tuohey, chairman; H. W. Kimball, A. H. Andrews, A. J. Hixon, and H. D. Temple, secretary.

Representatives of the National Electrical Contractors' Association will be present.

All the second day will be an open meeting. Subjects that will be considered by speakers will include the relations of electrical contractors to themselves, central-station co-operation, the relation of jobber to the contractor, the relation of the manufacturer to the trade, the National Electrical Code, account keeping, and overhead expense.

The Bancroft Hotel will be the convention headquarters. In the lobby of the hotel electrical jobbers and manufacturers will have facilities to place exhibits.

A banquet will be held at the Bancroft on the evening of September 24.

Flour Mill and Electric Plant Burned.

The electric light plant at Adel, Iowa, together with the flour mill of which it formed an enlarged auxiliary, was completely destroyed by fire on August 21. Fire broke out from an overheated boiler. The loss is $50,000, covered by only $10,000 insurance. The adjoining towns of Dallas Center, De Sota and Van Meter also depended on the plant for electric light and power. The plant was owned by the Adel Mill Company, L. M. Macy president and manager.

Electric Cooking in the South.

In spite of the difficulties of teaching colored help to use electricity, this form of energy is being extensively used in the South for preparing breakfasts and lunches. Electric cooking devices are very popular in many sections, especially during the summer months.

In many Southern homes the kitchen is a separate building behind the house and the advent of electricity makes it possible to prepare a light breakfast, lunch or supper right in the house and without excessive heat and bother, saving time and steps.

Installations of Tube Lighting in London.

The use of tube lights for outlining the facade of buildings is exemplified by the first and very conspicuous installation of Moore tube lamps on the front of the theater known as the West End Cinema, in Coventry Street, London, England, where three lines of tube on either side of the arched facade are employed to give an attractive outline of light, in connection with a neon-tube illuminated sign over the theater entrance. The columns of tube rise to a height of 48 feet, from their base just above the level of the second floor of the building. The tube is of 1.75-inch-diameter, clear, thin glass, and the three tubes on either side are united at the top by a short end section. The continuous length of each side is thus about 145 feet, allowing for the eight inches of tube which joins the three tubes at the upper end, these vertical and arching tubes being four inches apart throughout their length.

The tubes emerge from the building from two operating boxes, one being located on either side of a lobby within the building. Here are located the electrodes and contacts. The light is operated at the high pressure of 21,000 volts alternating current, which is produced through a rotary converter and step-up transformer set located in the basement, which receives direct current from the lighting circuit at 100 volts. The tube contains nitrogen gas, under very low pressure.

In external appearance the illumination is of a delicate shade of orange light which on near examination has the effect of glowing, and gently expanding and contracting, rings of light within the tube. The intensity of light is not so high as to make it painful to look closely at the lamp, but the effect of the novel installation is to furnish a brilliant display, which makes the building appear to be encircled with an arch of flame, and throws the shadows of the structure into deep relief. The value of the light for advertising purposes is obviously great, in that it draws the attention of the passing crowd in a fascinating manner.

The neon tube lamp which, by a series of convolutions of the glass of which it is composed, forms the sign letters "West End," has a distinctly reddish tinge, contrasting with the orange tint of the lamps above.

The words are formed by three distinct tubes, each about 35 feet in length, which wind in and out of the operating box located on the gallery referred to, which is reached through French windows from the lobby within the building. The letter *W* is formed by one tube, the letters *est* by a second, and the word *End* by the third. About half the length of the convolutions is contained inside the operating box, hidden from public view.

Each of these three tubes has an electrode and an auxiliary, wired from their ends respectively by positive and negative cables carried from a 6,000-volt transformer located within the box. Current for operation is received from the 100-volt direct-current lighting circuit, is changed to alternating-current through a rotary converter, and raised in a transformer to 6,000 volts for lamp operation.

The elementary gas neon is contained in an enlarged section of the tubes, about 6 inches long and 2.5 inches in diameter. This substance is admitted into the glass pipe in very minute quantities sufficient for about 1,000 hours of service. The neon, which gradually becomes contaminated, is cleared of foreign substances by passing through a sulphur deposit and copper filings and zinc foil.

In this type of lamp, the light gives the appearance of ruddy, glowing rings, which swell like smoke rings. The combination of the neon tubes with the nitrogen tubes makes an especially effective illumination for advertising purposes.

The use of the Moore light for interior illumination is exemplified by the extraordinary installation in the Liverpool Street station of the Central Lon-

Fig. 1.—Tube Lighting of Motion-Picture-Theater Facade.

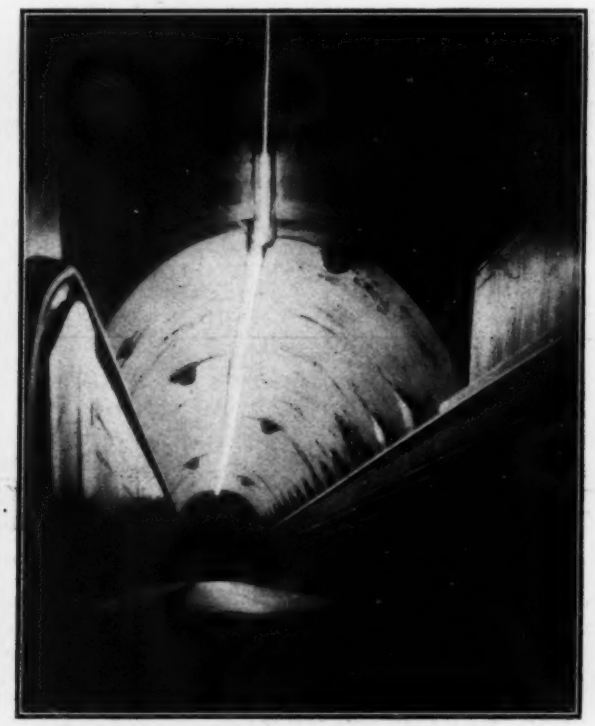


Fig. 2.—Tube Lighting of Escalator Shaft in Station.

don Railway, the electrified subway which runs through the heart of London under Holborn, Oxford Street and Cheapside and terminates at Liverpool Street in "the City."

Here two moving stairways, one ascending and the other descending, and a fixed stairway, are lighted, overhead, by a continuous Moore tube 255 feet in aggregate length. This tube is, like that on the cinema, of 1.75-inch clear glass, and is fastened to the ceiling of the three shafts by insulated brass rings. The three sections are joined at the lower landing by a horizontal tube, while on the wall at one side of the upper landing is located the operating box, suspended on the wall near the ceiling and well out of reach of the public. The positive electrode is located at the farther end or terminus of the tube, while the negative is contained within the box.

Fig. 3.—Horizontal Lower Section Joining Three Moore Tubes.

The lengths of tube above the stairways are within easy reach of the passengers, and for the most part are entirely exposed; but for short distances a protection to the brittle glass, which would readily be broken by a curious or mischievous person with a penknife or an umbrella, is afforded by a wire netting hung under the tube, while over a part of the stairway a zinc trough in short sections provides protection, though this is somewhat dimming to the light in that it cuts off the illumination from shining directly on the staircase.

The danger of public interference with the installation is recognized by the railway officials, who say that for the time being the public awe of the mysterious lighting provision is its safeguard. If the lamp were punctured, it would require about two days to repair the breach by "grafting" in a section of new glass pipe. To provide for a possible extinguishment through the breaking of the glass, or otherwise, 15 incandescent units of 35 candlepower each, in deck-lamp bowls are installed at intervals, in the ceilings of the shafts.

The operation of the Liverpool Street station installation is by direct current received at 500 volts from the company's escalator and station-lighting supply, sent through a rotary converter located in the escalator-operating pit below the floor level of the upper landing, and reached from thence by an iron stairway. Here the energy is changed to alternating current and raised to 28,000 volts through transformers located in the operating box on the wall above the upper landing lobby, as related above.

The new illuminating equipment, which was installed a few weeks ago in the nature of an experiment, is proving abundantly satisfactory. The use of the tube lamp is being considered, in London, for outlining the exterior lines of store buildings, and for interior show-room illumination.

It is stated that the length to which the tube light may be practically used is limited only by the electrical pressure applied at the electrodes.

Aluminum Cables.

Aluminum cables are being used for the Sequatchie Valley transmission line between the Hale's Bar power plant of the Chattanooga & Tennessee River Power Company and the main Nashville line at College, Tenn.

ELECTRIC LIGHTING IN THE BRITISH MUSEUM.

By W. B. Conant.

The use of electricity in museum illumination is interestingly demonstrated in the equipment of the new wing of the British Museum, in London, opened by His Majesty King George V on May 7. This extensive addition to the famous institution adjoins the original structure on the north side and is 380 feet in length, 50 feet in width and the height from the ground floor to the roof is 80 feet. The addition consists, in its superstructure, of three stories. The lower floor is used as a workroom and modeling room for the use of students, the floor above is given over to the display of a collection of Japanese and Chinese antiquities, and the upper floor is divided into two rooms, the westerly one, 220 by 50 feet, being devoted to an exhibition of prints and drawings, while the easterly room, 160 by 50 feet, is for the use of students in studies of art. Bookcases line the walls of this room, the upper half being reached from galleries running along either side.

Fig. 4—Upper Terminal of Moore Tube.

Entering the structure by the north entance, one finds on either hand a group of three 32-candlepower metallic-filament lamps installed in Holophane globes, supported by ornamental bronze brackets. A similar group is located at each of the two doorways leading from the lobby to the west and east rooms of this floor, and in the ceiling of the lobby are four groupings of four 32-candlepower ceiling lamps,

each group being inclosed in a large Holophane inverted dome.

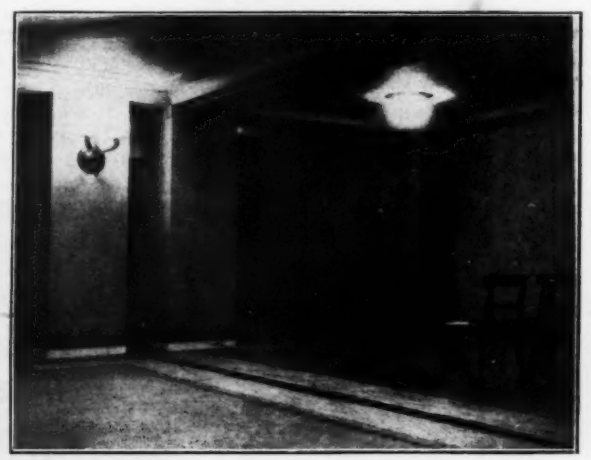
The vast hall devoted to the Oriental collection and extending the whole 380 feet in length, is lighted by two lines of eight-ampere open-type Crompton arc lamps, installed two in series, and spaced at 15-foot intervals, one lamp being located opposite the center of each nine-foot-deep bay in which are the cases containing the exhibits. The lamps are suspended 12 feet above the floor and 8 feet from the ceiling. Opalescent globes are employed, which shade the light from disagreeable glare and at the same time produce the diffused illumination so desirable for the inspection of exhibits. Each of the cases, which occupy the space between square pillars of the hall and the outer walls, is lighted from the top by 12 16-candlepower metal-filament "strip" lights, installed in pairs in rectangular mirror reflectors just above the glass top of the case. The effect of the mingled arc and incandescent illumination is on the whole excellent, though the chief electrician's criticism of the architect's specification, that the 15-foot spacing of the arm lamps is too close, appears to be a just one.

Passing to the top floor, one finds the illumination of the gallery of art exhibits to be with the same type of arc lamps as are employed in the Oriental gallery below, but these are of 10 amperes and are spaced at 25-foot intervals, being suspended from the ceiling just outside the wide skylight piercing the roof. These lamps are about 15 feet above the floor and are so arranged as to diffuse sufficient light both on the cabinets of prints and other art products which line the walls, and on the racks which occupy the floor space. The light-colored oak woodwork and the light tints of the walls and ceilings lend themselves to the excellent lighting effects of this gallery.

The students' room, just east of the gallery, is finished in dark mahogany, with desks and tables of the same wood. Here 32-candlepower metal-filament lamps of the newest types are employed, being installed on plain, square bronze arms over the high desks used in the artists' work. In general, four lamps light each desk, and two-armed brackets are installed over each cabinet, the lamps pendent and overhanging the faces of the cabinets, to light the drawers when opened. The bookcases reached from the gallery are lighted by 16-candlepower metal-filament strip lamps, installed in pairs in rectangular metal reflectors, overhanging the face of the cases six inches, the reflectors being deflected at such an angle as to shed light over the whole case front. Cardboard shades, white inside and green without, are employed over the reading and desk lamps.

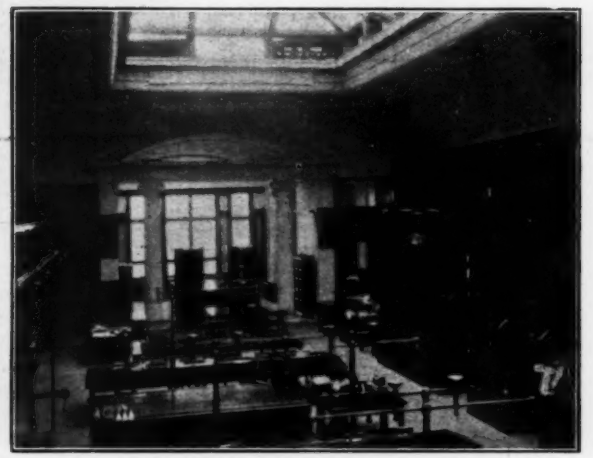
The main hall, which occupies the structure joining the new wing to the original Museum, is about 75 by 60 feet in floor dimensions and its lofty roof is supported by black marble pillars. On both sides of the hall, which later will be used as a reading and study room for regular students of the various collections exhibited in the wing, is a deep alcove, faced on the outer

Chinese and Japanese Exhibition Room.



Lobby of King Edward VII Galleries.

Gallery of Prints and Drawings.



Students' Room, Department of Prints and Drawings.

side with bookcases. A gallery runs along both sides and across the back of the hall, giving access to additional bookcases.

The main hall is lighted at present with 16 10-ampere Crompton arcs, 8 of which are suspended over the clear floor space and 8 over the galleries. When the floor space is furnished with tables for the students, shaded incandescents will be installed over each reader's space.

Around the floor of the galleries and fastened to the outer edge of it, are installed a continuous line of 16-candlepower metal-filament lamps having Holophane bell-shaped reflectors, installed at intervals of 9 feet and 6 feet 6 inches around the sides and across the back of the hall. The lamps are operated on 115 volts.

The lighting of the entire building is accomplished with current generated by a private plant located in the basement. The plant is in duplicate, an old installation being kept in reserve as an auxiliary to an excellent modern plant. The maximum load is about 600 kilowatts. In the entire Museum there are 280 arc lamps and between 4,000 and 5,000 incandescents of 50-, 32- and 16-candlepower, the latter size predominating.

In general, the rooms devoted to the collections throughout the older portion of the Museum are equipped with Siemens 10-ampere arc lamps, inclosed in opal globes and suspended in most cases from angle irons set in the center of skylights in the roof or to floor trusses of the floor above. The smaller rooms have each only one such lamp, centrally located and about 12 feet above the floor, which furnishes sufficient illumination to the interior of cabinets, etc., to provide excellent opportunity for the inspection of exhibits, even the more minute and complex. Larger rooms are equipped with two, three and more lamps of the same type, spaced in general about 20 feet apart, and usually pendent from skylights, most of the galleries of this low structure having such outlook. The exceptions to the general scheme are the galleries devoted to potteries, bronzes, vases and Greek and Roman antiquities, and the ethnological gallery. The former rooms are lighted by a temporary installation of two rows, in each room, of 16-candlepower incandescents, pendent about five feet from the ceiling and unprovided with shades. These lamps are spaced at intervals of only three feet. The ethnological gallery has a temporary equipment of groups of three 32-candlepower incandescents, the lamps being half frosted. These lights are equipped with glass shades, and are installed in a double row, one on either side of the long gallery. Another small room, the Waddesdon Bequest Room, filled with arms, jewels, plate and carvings, is lighted with ten 16-candlepower carbon lamps in glass bell shades, of alternately plain and ornate pattern.

In addition to the arc lamps, the room of terra cottas, which are displayed in glass-fronted cases, has an installation of 48 50-candlepower incandescent lamps, half frosted, in deep glass shades, installed in lines just over the glass tops of the cases.

The inferior efficiency of the incandescent installations, apart from those used in connection with the cabinets of exhibit., is readily noted in touring the rooms. The chief electrician, Carl Sachs, to whom the writer is indebted for the courtesy of access to the information here presented, holds that

Bookshelf Lighting in Students' Room.

Crompton arc lamps, with opalescent globes, are the most efficient units for museum illumination. The small carbon units will soon be replaced by units of the more efficient type.

The great reading room of the library, which occupies a circular hall under a vast rotunda in the center of the group of structures, is lighted by five 35-ampere Siemens arcs with opal globes, suspended from the dome, about 25 feet above the floor. In addition, 16-candlepower carbon-filament lamps are installed over the desks and reading tables. The wires for the lighting of the older portions of the Museum are carried through the floors, and of the lower gallery of the library are carried in iron conduit laid on the floor of a narrow gallery above. The reading lamps are equipped with cardboard shades, white inside and brown without.

The general control of the circuits is had from the main switchboard in the dynamo room. Panel boxes are located on each floor for the control of the various rooms of that floor, and each wing also has a secondary wall box, the circuits being controlled through snap switches grouped in lines, the handles protruding through a bronze jacketing. The fuses are located above in a separate compartment. Each portion of the box has a glass door of its own.

The reading room of the Museum is open from 10 a. m. to 7 p. m. daily. The galleries are open from 10 a. m. to 6 p. m. in summer, 5 p. m. in spring and fall, and 4 p. m. in winter, and on Sundays from 2 to 6, 5:30, 5, and 4, according to the season. Ordinarily the lighting equipment is required only an hour or less at dusk, except in very dull weather, which is of common occurrence during much of the year, especially in winter. On the average, on forty full days of dark and foggy weather each year the artificial illumination has to be resorted to, so the need of efficient installation is imperative.

Boston Street Lighting.

The Boston City Council last week voted not to accept the proposed contract between the city and the Edison Electric Illuminating Company of Boston to furnish energy for street lighting. The company offered to furnish lighting with 6.6-ampere magnetite arc lamps at $87.53 per year, on a ten-year contract. The present rate for units of this size is $103.54. The Edison Company offered to date the reduced price from April 1 of the present year.

Mayor Curley advocated the acceptance of the proposed contract, urging that the rate of charge is fair, in view of the estimate, based on the Company's sworn returns to the Electric Light Commission, by which the engineer of the Finance Commission showed that the rate of $87.53 would yield only about 6.5 per cent, with no allowance for depreciation.

The Mayor pointed out to the Council that under the proposed 10-year contract the city is entitled to 66 per cent of the economies resulting from improved equipment.

The Council voted to request the Mayor to give the Edison Company the year's notice required by the present contract for its termination.

An order requesting the Mayor to petition the Gas and Electric Light Commission for an investigation of the price of electricity in Boston was referred to the Executive Committee.

The city of Dawson, Yukon Territory, Canada, is planning to establish a municipal electric lighting and telephone plant, to cost $165,000.

THE TREND OF THE LIGHTING BUSINESS.

By M. C. Turpin.

Within the past year one of the greatest improvements in incandescent lamps, from a commercial viewpoint, that the industry has seen, has been made. By filling the lamp bulb with a gas the lamp can be practically operated at a very much higher efficiency than can the vacuum lamp. This increase in efficiency has opened up a much wider market for incandescent lamps of high candlepower.

Industrial Lighting.—For industrial and display lighting such lamps are particularly popular because they can be used with a very low-priced, durable and efficient fixture. This fact, more than any other single thing, makes the lamp very popular for short-hour burning, where the somewhat higher efficiency and lower maintenance cost

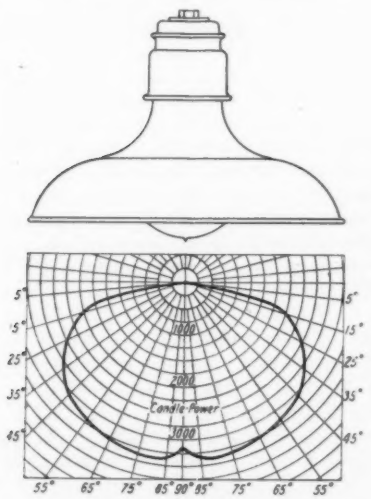


Fig. 1.—1,000-Watt Mazda Lamp.

of the long-burning flame-carbon arc lamp is somewhat offset by the simplicity and low initial cost of the large incandescent unit.

In the use of any lamp, the complete unit must be considered rather than the bare source of light without the necessary modifying reflectors and glassware. Thus it will be seen from Figs. 1 and 2 that very similar use may be made of a high-power arc or incandescent lamp for industrial work but that the energy requirement of the arc lamp for a given illumination is much lower than that of the incandescent lamp.

The long-burning flame-carbon arc lamp alone of all the types of arc lamps previously marketed seems desirable for future industrial installations or display purposes. Many of the older and less efficient lamps will undoubtedly continue in use long after

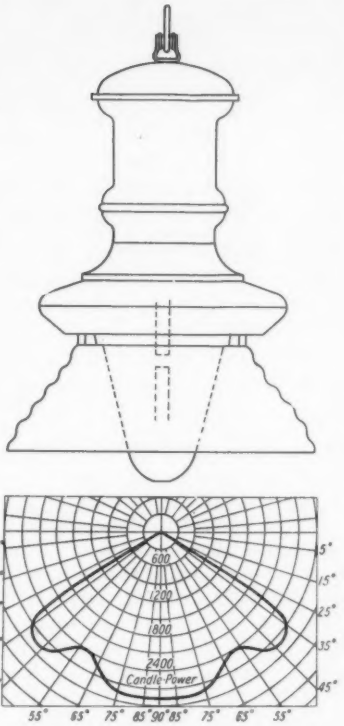


Fig. 2.—500-Watt Flame-Arc Lamp.

their low efficiency would indicate they should be replaced as a matter of economy. The metallic-flame lamp, though very efficient and low in maintenance cost, is but poorly adapted to industrial work; first, because most of the light is thrown close to the horizontal and cannot be efficiently redirected by a reflector as can the light from an inclosed arc; and second, because the lamp is only suitable for direct current and the necessary sustaining resistance greatly reduces its efficiency when operated on a multiple circuit.

Street Lighting.—The series incandescent lamp in all sizes, except the very smallest, is greatly improved in efficiency by the introduction of the gas-filled lamp with consequently increased popularity of such systems. The large incandescent lamp, such as Fig. 3, for street series service now available should be very popular as it makes the incandescent systems more flexible, although the protecting globe about such lamp necessarily reduces the nominal half-watt efficiency by a considerable percentage.

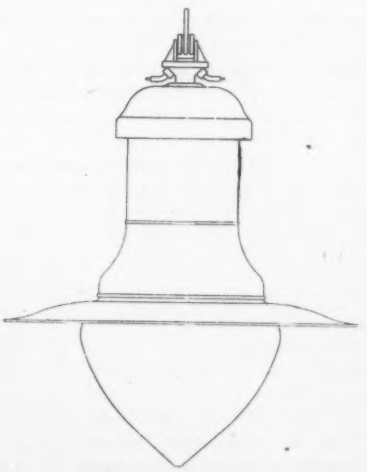


Fig. 3.—Luxsolite Street-Lighting Fixture.

The efficiency of the metallic-flame lamp (Fig. 4) is relatively very high, however, and with a distribution closely approaching the ideal for street lighting without the use of a reflector. Although direct current is necessary, the mercury-arc rectifiers in use are very efficient in operation, most operators averaging from one thousand to two thousand hours per bulb. This makes it possible in most cases to maintain the four-ampere metallic-flame lamp for from $5.00 to $7.00 per lamp per year of 4,000 hours. This figure includes electrodes, globes, repairs, rectifier bulbs and the necessary labor of trimming and cleaning.

Fig. 4.—Metallic Flame-Arc Lamp.

Without ample data, which are not yet obtainable from actual working installations of high-efficiency incandescent lamps, the very low maintenance cost, high efficiency and reliability of the modern arc lamps should not be overlooked on account of the low first cost of the newer high-efficiency incandescent units.

More Boston Subway Construction.

The contract for building Section D of the Dorchester Tunnel in Boston, Mass., for use of the Boston Elevated Railway Company, has been awarded by the Transit Commission to the Hugh Nawn Contracting Company, the lowest of seven bidders. The contract price is $673,780.

Section D will be about 800 feet in length, half to be built in tunnel excavation and half in open cut.

Central-Station Practice and Experience with Gas-Filled Tungsten Lamps.

The continual development of the lighting industry is bringing out new types of electric lamps every few years. The general tendency has been toward improved efficiency, and better all-round performance, thus steadily broadening the field of electric lighting. As each new lamp is introduced, however, it must overcome by its merits the natural conservatism which prohibits the industry from rushing indiscriminately from one illuminant to a more modern one. The new gas-filled tungsten lamp, commonly referred to as the nitrogen lamp, is gradually emerging from its period of tribulation and probation and the results already attained by it during its approximately eight months of commercial existence in this country are therefore of peculiar interest.

In order to present to its readers a broad summary of the experience of the lighting industry with the new lamp and an outline of prevailing practice in its exploitation, the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN directed inquiries to a large number of representative central stations in various parts of the country. The following report is based on the many replies received.

Many central stations, of course, have not on account of financial restrictions and other causes done much experimentation with the new lamps and have preferred to await the results obtained by others better situated to take up a new line of development. Others, while trying out the new units on a modest scale, have found them to be worthy of active promotion, but have not had sufficient time and experience to map out a definite campaign. In relatively few cases has a well defined policy been adopted respecting sales, rentals or renewals.

One of the reasons for retarding this development was the comparative slowness of American manufacturers in putting the lamps on the market in sufficient quantities to meet the early demand for trial installations, although abroad they were to be had several months earlier. Another reason was that the early lamps, as was to be expected, were more frequently defective and short-lived. However, the manufacturers almost invariably stood behind their product and, although not ready to guarantee the early lamps definitely, freely replaced lamps that were clearly defective. Improvement in manufacture has been steady and each month since last winter the number of lamps reported defective has rapidly diminished until at the present time they are shipped with the same assurance of freedom from defects that characterizes the standard vacuum-type drawn-wire tunsten lamp.

A fear felt in some quarters that the new lamps, on account of their very high efficiency, would produce further reduction in the appropriations required for lighting purposes has been found to be largely groundless, since the superior quality and quantity of light they give leads to the much more liberal use of electric light. Some central stations, however, are planning to put the lamps out in sufficient size so that their customers will not decrease the amount of their lighting bills, but will simply get more light for the same money.

Probably most of the new lamps as yet put into service on central-station circuits have been installed for spectacular or advertising purposes in front of motion-picture theaters, hotels and large stores. They have given good results in this service and occasionally replaced flame-arc lamps because of their simplicity of maintenance and steadiness of light. They are not so spectacular as the yellow-flame lamp, however.

For interior lighting the new lamps have been installed in many large department stores with gratifying results. For this purpose the 750-watt and 1,000-watt sizes have usually been found too large except in cities of the first magnitude. The 400 and 500-watt sizes of the multiple lamps recently introduced have therefore filled a special demand for use in such establishments in the smaller cities. Some managers would like to see still smaller lamps placed on the market to meet the requirements of small towns.

Both in the case of outside and inside lamps, it has been found that the new lamps easily displace the so-called gas "arc." In many cases older types of electric arcs have also been displaced.

As to policies in selling and renting the new units, but few central stations have adopted aggressive selling plans as yet. In most cases the lamps are sold direct to the customer at practically cost price and without definite guarantee, the customer assuming the cost of installation and renewal. In some few cases the lamp and suitable fixture are put out on 30 days' trial and then sold at cost, as are renewals; this is the case at Wheeling, W. Va. In quite a few cities it is the policy of the central-station company to turn over all sales of lamps, fixtures, appliances, etc., to local dealers or contractors and these have in several cases actively pushed the sale of the new lamps with good results; this practice is followed in La Fayette, Ind., Meridian, Miss., Dayton, O., Nashville, Tenn., Albuquerque, N. M., Fargo, N. D., and other places.

Specially attractive prices for gas-filled lamps are made, both for originals and renewals, in Chester, Pa., with the idea of encouraging their use. In Roanoke, Va., the central-station company has adopted the extremely liberal policy of furnishing, installing and maintaining free of charge the 750-watt lamp and fixture, the only charge being for current at the commercial lighting rate. At Fresno, Cal., the lamps are either sold directly or rented and maintained with fixture at 50 cents per month. In Cincinnati, O., the larger lamps are supplied on a maintenance basis similar to the old commercial arcs.

One of the cities which has been specially active in pushing the lamps is Akron, O., where a department store has recently been equipped with 300 500-watt lamps; 27 motion-picture theaters use them, also many merchants; a tennis court is illuminated with gas-filled lamps and a race track is to be similarly equipped. The confidence placed in the lamps is akin to that based on a life test being conducted at Mobile, Ala., where a 750-watt lamp is still burning after more than 4,048 hours continuous service.

The lamps are also being installed on series street-lighting circuits in a number of cities served by central-station street lighting. Among cities that have recently arranged for such service are Dayton, O., and Dubuque, Iowa. The municipal lighting department of Cleveland, O., is also contemplating such a change. The municipal street-lighting system of Chicago is introducing the gas-filled lamps on a number of circuits in the residence districts.

Denatured Electricity.

Under this heading the *Electrical Review* of London mentions a method devised by an Italian engineer for preventing the improper use of electric current. The practice is becoming general in Europe of making especially low rates for energy to be used for heating, cooking and power, and it is difficult to prevent the use of lamps on circuits intended for these purposes.

This engineer advocates the use of special circuits on which the voltage is subject to extreme fluctuation at recurring intervals, which would make it practically impossible to use lamps on the circuit on account of the flickering. As the current is not entirely interrupted and normal voltage is quickly restored, the proper operation of power and heating apparatus is not interfered with.

Our contemporary states that this system would be fatal to the use of luminous radiators. Since the fluctuations could be entirely below the normal voltage, however, and since the luminous radiator is preferred to other heaters on account of some resemblance to an open fire, it is not evident that the flickering would be a disadvantage for this purpose.

The Outlook.

Probably at no time in the history of electrical development, and certainly not within recent years, has the demand for current information respecting the outlook in industry been so insistent and so hard to satisfy. It is to be expected that even in the face of imminent retrenchment the aggressive business man will hold an optimistic view of conditions in general. It is expected that the real trouble concerning the actual state of affairs in many manufacturing organizations will be concealed from view as long as possible. It is a fact, however, that as long as there is available a sufficient volume of business to justify an optimistic rather than a discouraging point of view the evil day of wholesale retrenchment and shrinkage in business development will be kept away. Within the past ten days the electrical industry and industries at large have been pretty well sounded, and the reports upon which the following presentation is based have come from the leading manufacturers of electrical supplies, the leading electrical supply jobbers and the publishers and editors of the leading class publications devoted to the various industries into which electrical apparatus enters largely as an element of production. It is believed that these reports reflect very truthfully the actual conditions as they appeared at the time of writing. It is also positively believed that the present indications are that subsequent developments will not be of a nature that will negative to any material degree the expression of opinion as outlined hereafter.

The Electrical Trade from the Supply Jobbers' Viewpoint.

The New England Engineering Company at Waterbury, Conn., hesitates to speculate as to the future. It is expected that there will be a little more activity in the consumption of electrical supplies between September and January than has taken place in the past few months. W. G. Morse, secretary of the company, states that as far as his observation goes the policy of business men seems to be not to invest any more capital than their present business demands until there is a more settled legislation at Washington and more is known as to what effect the European war will have on this country's business.

J. P. Coghlin, treasurer of the Coghlin Electric Company, Worcester, Mass., believes that while new projects are being held up, there is a large amount of building under way. Locally, factories are fairly busy. The company had every reason to believe that business was improving up to last July, and while July business was not up to a year ago, the prospects were very good.

John J. Leahy, president of the W. F. Irish Electric Company, New York, states that prior to the war conditions were improving, but that since its inception a damper seems to have been put on business generally.

B. H. Ellis, vice-president and treasurer of the Manhattan Electrical Supply Company, New York, finds it hard to form an opinion, but with others felt that before the war broke out trade conditions were going to be very good this fall.

W. E. Robertson, vice-president and general manager of the Robertson-Cataract Electric Company, Buffalo, N. Y., believes that some lines of manufacture, competitive with foreign production for American supply, will be working night and day, now that foreign competition is eliminated. Other manufacturers who depend upon foreign raw and semi-finished materials will be seriously handicapped. The probability is that building operations will be withheld because of the fiduciary institutions discouraging new enterprises for the present. There will be some pretty general economy, and as capital will be in great demand, rates for its use will be high. If the war is of short duration we will witness an enormous increase in business immediately following its termination. If the war is of long duration there will be a slow but steady increase in business until such time as the war does end, when the total domestic and foreign demand will be greater than anything this country has ever witnessed. It will be the part of wisdom for electrical jobbers to sit tight, watch their expense accounts and conserve their resources, watching the situation closely and be prepared to take advantage of the floodtide of prosperity when it gets in, which in all probability will not be until the spring of 1915.

H. J. Gorke, Syracuse, N. Y., states that the present year's business showed a considerable increase over last year and the company is looking forward to good business for the balance of this year.

Eugene A. Rumsey, president of the Rumsey Electric Company, Limited, Philadelphia, Pa., believes that central stations will complete what they have laid out to do. Industrial plants of concerns doing largely export trade have already curtailed buying. Manufacturers depending upon domestic trade are still buying well for immediate needs, and contractors do not show that they have been affected as yet. The outlook, however, he fears grows darker as the war continues.

L. V. Garron, manager of the Philadelphia Electric Company's Supply Department, Philadelphia, finds business about normal.

C. Phillips Hill, president of the Doubleday-Hill Electric Company, Pittsburgh, Pa., finds business quiet on account of hostilities, but is anticipating good business during the fall and winter in the expectation of resuming exports from this country. These will be greatly stimulated by demands from South American countries due to their imports being cut off from European sources.

Thomas M. Cluley, assistant to the vice-president of the Union Electric Company, Pittsburgh, Pa., states that business is running along on an average of about 20 per cent less than last year. Stock is being kept strictly up to date, and in such quantities as to take care of any increase in business without inconvenience. Collections are good, but while everybody seems to be optimistic, they are apparently sitting tight.

E. C. Graham, president of the National Electrical Supply Company, Washington, D. C., has had a satisfactory volume of business during the past year. There has been an increased cost of handling orders owing to sharper competition in taking small orders, and due to a diminished volume of large business. Collections are not good, and new accounts are being sought only where they are gilt-edged. He believes that we must expect a temporary contraction until busines has readjusted itself to new conditions.

Oscar C. Turner, president of the Turner Electric Supply Company, Birmingham, Ala., feels that business conditions are improving and looks for a good many items in the electrical supply business and automobile accessory business to advance materially. The reaction of the European war will be most beneficial to all lines in this country, and if it keeps

up for eighteen months or two years it is bound to help us that much more. New lines of business will be open to this country, and while there is a depression now and collections are somewhat bad, we will see better times very shortly.

James Clark, Jr., president of the James Clark, Jr., Electric Company, Louisville, Ky., is optimistic and feels that in the course of a few weeks or a few months at the longest, business in the states is bound to be good. There has been a falling off in the jobbing end of his business, but the manufacturing department keeps up very well.

J. L. Damble, secretary of the Harry I. Wood Company, Louisville, Ky., finds some contraction in business in that section owing to more conservative buying. With others, he shares the view that if the war is checked it will make business in the United States good.

From Indianapolis, Ind., C. S. Walker, secretary and treasurer of the Varney Electrical Supply Company, sounds a reassuring note of an indication of better business conditions in that territory.

C. W. Johnson, president of the Johnson Electric Supply Company, Cincinnati, O., has had a satisfactory year and believes that the country generally will show a big improvement in a short time. This will be due to some extent because the people of this country will be compelled to use American made goods and influence capital to a greater investment of their money closer to home.

W. S. Bissell, sales manager of the F. Bissell Company, Toledo, O., states that the volume of jobbing business is at present up to normal, and inquiries in hand lead the company to look for a good fall and winter trade at least.

Oscar Avery, president of the Avery-Loeb Electric Company, Columbus, O., reports an increase in business for the first seven months of this year, and indications of good orders for the next four months. Traveling representatives report business quiet throughout the territory, but conditions show a marked improvement in southern Ohio since the coal strike has been settled.

W. R. Herstein, secretary and treasurer of the Electric Supply Company, Memphis, Tenn., reports unfavorable indications in the southern territory. A large amount of lumber is ready for shipment that apparently cannot be moved. Cotton is still in the fields and will not begin moving for a month. The outlook is unfavorable. For these reasons the people are buying only to supply their immediate requirements. Business in Missouri, Kentucky and eastern Tennessee continues almost normal, but in the lumber and cotton-growing districts the outlook is discouraging.

A. W. Lindgren, general manager of the Northern Electrical Company, Duluth, Minn., reports that prior to the outbreak of the European war the indications pointed to a banner year in that section of the country. There is a fair amount of prospective business in view, but he feels that if the disturbed conditions continue that the total volume will not reach what it did in 1913.

B. B. Downs, president of the St. Paul Electric Company, St. Paul, Minn., finds cause for optimism in the splendid crop results enjoyed by the Northwest. He believes that a number of small towns will put in electric light plants and that there will be plenty of money to do it with. His company is looking for good business for at least a year and a half.

S. G. Neade, secretary of the United Electric Company, Wichita, Kan., finds a very satisfactory indication. Crop conditions have been above normal on many products and his territory will not be affected to as great a degree as other communities farther east. Unless the outlet for agricultural products is absolutely closed, the coming fall months will be more prosperous than for the last two or three years.

R. W. Hodge Electric Company, Kansas City, Kan., also finds large promise of good business, due to the excellent crop results.

F. M. Bernardin, president of the B-R Electric & Telephone Manufacturing Company, Kansas City, believes, on the other hand, that the benefits expected from the unprecedented wheat crop harvested in Kansas and Oklahoma will be neutralized on account of the stopping of exporting to Europe.

Max McGraw, president of the McGraw Company, Sioux City, Iowa., believes that unless the war interferes with the bond market to such an extent that it will be hard to dispose of bonds for municipal and private utility enterprises, that there will be little interference with business, as the crops in that territory have never been better. The company has in the neighborhood of $200,000 worth of new plant work in course of completion entirely outside of its regular supply business. This covers plants in Kansas, Nebraska, Iowa, Minnesota and South Dakota.

J. B. Terry, manager of the J. B. Terry Company, Cedar Rapids, Iowa., is banking on the crop conditions to keep the jobber in that territory busy.

G. A. Seabury, secretary of the Mid-West Electric Company, Omaha, Neb., believes that conditions will be good locally on account of the crop conditions.

C. J. Stahl, manager of the Korsmeyer Company, Lincoln, Neb., considers that from every standpoint the outlook is good.

From Salt Lake City and Butte the Inter-Mountain Electric Company, Capital Electric Company and the Montana Electric Company, respectively, look for a considerable shrinkage in business owing to the shutting down of considerable equipment in the copper-mining plants of that country.

E. C. Armstrong of the Nunn Electric Company, Amarillo, Tex., is depending on the bumper wheat crop and the excellent condition of other crops and cattle for a prosperous business this fall.

W. K. Hawthorne of the Barden Electric & Machinery Company, Houston, Tex., believes that the hold-up will be but temporary, and that the first of the year will show improvement enough to allow business to continue at its best, disregarding the war troubles in the foreign countries.

M. B. Wheeler, of Houston, Tex., is optimistic. Texas is particularly fortunate with splendid crops and a clarifying of the Mexican situation will make business good in the southwestern portion of Texas.

W. W. Low, president of the Electric Appliance Company, Chicago, says, "don't rock the boat." There has been some falling off in business during August, but on the whole the year has shown an increase. There has been an advance in the cost of handling orders due to a lack of the usual tonnage business and increase in the demand for small quantities of material to be delivered by parcel post. The early fall should bring the electrical business back to a normal condition and the early winter months should show considerable prosperity.

M. B. Austin, president of M. B. Austin & Company, Chicago, finds the outlook most encouraging. A heavy falling off when the European war started was anticipated, but the reverse has been this company's experience. Business has been so conservatively conducted for the past two years that there are practically no surplus stocks, basic conditions are good, and when things once get a start, Mr. Austin looks for the greatest revival of healthy business the country has ever known. He points particularly to the fact that the character of electrical work is being constantly improved, and is resulting in an increasing demand for better grades of material, where this company handles two grades of staples the demand in many specific cases is for the material of the highest class.

George A. McKinlock, president of the Central Electric Company, Chicago, would not hazard a guess with events moving so rapidly and occuring so unexpectedly. T. C. Ringgold, general sales manager of the company, states that there is every indication of depleted stocks which cannot be replenished from abroad. This is a time to carefully watch the matter of prices for electrical commodities, and profits must be closely watched in order that the valleys caused by loss of business, decreased values and other liabilities can be properly met.

W. H. McKinlock, president of the Metropolitan Electrical Supply Company, Chicago, believes that the American businessman is capable and prepared to adjust himself to new conditions, and that the

situation requires only an accommodation to an adjustment along new lines.

C. E. Browne, president of the American Electrical Supply Company, Chicago, states that inquiries have changed considerably in character, and that they are not of as great a volume as heretofore for material entering into building construction. On the other hand, demands for other material have increased so that in the aggregate there is little complaint to make. In fact the only complaint to be offered just now is in connection with collections, the delay in which is probably due to high rates of interest, hence extensions of credit are asked for more frequently now than has been the case recently.

The Electrical Trade from the Manufacturers' Viewpoint.

By and large the manufacturers of electrical apparatus are optimistic. This, however, is the case more particularly with the smaller organizations, the big institutions suffering more keenly in a time of any exaggerated slackening in demand. Apprehensive of their ability to float bonds for extensions, due to the reluctance upon the part of the public to invest at the present time, public-utility companies are materially curtailing their operations. This situation is reflected very quickly in the reports of the selling organizations of the big companies and it appears to be a fact that there is a discouraging dearth of inquiries. Upon the other hand, a great many of the smaller manufacturers report themselves not only well satisfied with the outlook, but because the year has generally been better than the average, they find themselves in good condition, both with respect to the way their organizations are manned and with regard to their surplus capital account, to take advantage of whatever way the commercial wind may blow.

Opinion as to the outlook from the manufacturers' viewpoint is spotty. There are, as indicated heretofore, many who consider the outlook for the immediate future quite favorable. These include the Wiring Equipment Company, New York; McGill Manufacturing Company, Valparaiso, Ind.; Minneapolis Electric & Construction Company, Minneapolis, Minn.; Burnley Battery & Manufacturing Company, North East, Pa.; Roth Brothers & Company, Chicago; Chicago Mica Company, Valparaiso, Ind.; Detroit Insulated Wire Company, Detroit, Mich.; Electrical Engineering Company, Minneapolis, Minn.; Duncan Electric Manufacturing Company, Lafayette, Ind.; Rome Wire Company, Rome, N. Y.; Economy Fuse & Manufacturing Company, Chicago; Northwestern Electric Company, Chicago; Oshkosh Manufacturing Company, Oshkosh, Wis.; General Devices & Fittings Company, Chicago; Hughes Electric Heating Company, Chicago; Western Conduit Company, Youngstown, O.; Sangamo Electric Company, Springfield, Ill.; Independent Electric Manufacturing Company, Milwaukee, Wis.; Sherwin-Williams Company, Cleveland, O.; Detroit Fuse & Manufacturing Company, Detroit, Mich.; Smith & Hemenway Company, New York; Packard Electric Company, Warren, O.; Tubular Woven Fabric Company, Pawtucket, R. I.; W. R. Ostrander & Company, New York; Beardslee Chandelier Manufacturing Company, Chicago; Dossert & Company, New York; Railway & Industrial Engineering Company, Pittsburgh, Pa.

In a good many directions manufacturers are disposed to regard the future as ominous. The general consensus of opinion of this sort, however, is to the effect that up to the outbreak of European hostilities the promise was fair for a considerable increase in business. It is surprising that in so many instances the record of the last four months of the present year indicate a falling off on an average of about 20 per cent under the volume of business for the same period a year ago.

One large eastern manufacturer of panelboards and switches was so sanguine of improving conditions that a new line of manufacture had been taken on involving a considerable cash investment. While the outlook at present is not so cheerful, this company is erecting a new building on the firm conviction that business will soon be better.

The Holophane Works of the General Electric Company reports that the development of the new high-efficiency Mazda lamps has, by opening a new outlet for products in outdoor lighting, helped the reflector and fixture business decidedly. This company believes that the European war will result in an increased demand for glassware of American manufacture.

The Crawford Cedar Company, Menominee, Mich., believes that there is no question as to a good volume of business in order to take care of the projects contemplated.

W. C. Sterling & Son Company, Monroe, Mich., sees an opportunity for good business later on when railroad and other corporations which have been neglecting their maintenance, get into a position of readjustment so that they may take care of very necessary rehabilitation and extensions.

The Pittsburgh Transformer Company reports that business for the last six months has been the largest in its history. Prospects for the immediate future are excellent. Inquiries in all departments are above normal.

The Kuhlman Electric Company, Elkhart, Ind., reports an increase of 25 per cent over last year for the first half of 1914. With regard to the immediate future the company feels quite optimistic. Contracts recently closed in addition to business on the books will keep the company working full time during the balance of the year.

The Electric Machinery Company, Minneapolis, Minn., reports a consistent gain over last year, and indications point to this position being fully maintained.

Hubbard & Company, Pittsburgh, Pa., believes that construction work will be carried on more favorably and economically during the next few months than at any time during next year. The acceleration which will set in toward the end of the year, however, will make the spring of 1915 a banner one in the electrical industry.

The Chelten Electric Company, Philadelphia, reports the best season it has ever had. There is a good number of contracts on hand for future delivery, and the company is optimistic as to the coming months.

The Morgan Crucible Company, Limited, New York, reports business for the last two months heavier than any other two months in the history of its American branch. So far as the war is concerned this apparently at the writing (August 17) had had no effect, judging from orders and inquiries.

The Jefferson Glass Company, Follansbee, W. Va., reports a good deal of stagnation in the demand for illuminating glassware during the past five or six months. There is every evidence of a marked improvement and the possibility of a large volume of business during the latter part of the year. The curtailing of supplies of raw material from abroad will undoubtedly cause a sharp advance in the prices of material, and this will be reflected in the selling prices of the finished glass.

The King Foundry Company, St. Joseph, Mo., reports a very satisfactory volume of business and a number of excellent contracts in hand for its ornamental street-lighting specialties.

The Adapti Manufacturing Company, Cleveland, reports a decided in-

crease in July over the same period of a year ago and a similar condition for August operations.

The Hamilton-Beach Manufacturing Company, Racine, Wis., is preparing for a strenuous factory run.

The Southern Exchange Company, New York, reports a considerable demand during the first six months of 1914 for overhead construction material for maintenance and short extensions. There has been very little demand for material for new work either in the electric light or traction field. There are, however, several very encouraging propositions in both the lighting and traction fields that are ready to go forward as soon as present conditions clear up.

The Kandem Electric Company, Incorporated, New York, exclusively an importing house, prior to the European outbreak was looking forward to one of the best winter seasons the company has experienced. This company feels that whether or not the European crisis is likely to affect the trade of the United States during the next six months depends entirely upon the attitude of the manufacturers in this country and the position taken by those controlling material and merchandise of every description. Factory conditions in Europe will respond slowly to readjustment at the end of hostilities. American manufacturers should prepare at once to meet the immediate demand for material and merchandise of every description to satisfy the markets heretofore supplied from abroad. Although an importing house, the company is in the fortunate position of having obtained just prior to the outbreak of hostilities the whole of its fall and winter stocks. The company announces a policy of pro rating whatever material it has in small quantities at standard prices among the largest number of its customers so that as far as possible all will benefit equally.

The Electrical Trade from the Publishers' Viewpoint.

The American Blacksmith.

W. O. Bamhardt, Editor.

Business outlook in our field is excellent at the present time. Reports come to us from practically every section of the country indicating an excellent fall and winter season. Contrary reports are very few and far between, so that we believe we are safe in predicting a return of prosperity that promises to at least equal anything previously experienced in our field.

Bakers' Helper.

H. R. Clissold, Editor.

At present there is a little disturbance in the baking business as a result of the war in Europe; prices of raw materials have advanced; but, in the judgment of the leaders they will soon resume their normal level, or very near it. Independent motors are being used more and more for bakers' machinery, and there is a constantly increasing use of machinery in bakeries. Small bakeries which a few years ago never thought of using machinery, now find it profitable. Altogether, the outlook for the baking business is hopeful.

Mining World.

C. A. Tupper, Secretary-Treasurer.

The mining and metallurgical industries will unquestionably absorb a much greater quantity of electrical machinery, apparatus and supplies than ever before. This is due to the almost universal changing over to electric drive in the mines, headworks, ore concentrators and washers, tipples, breakers, crushing and sampling plants, converter stands, smelters, refineries, etc., including both underground and surface haulage.

A noteworthy feature, wherever water power exists, is the building of hydroelectric plants and extensive transmission systems, substations, etc., covering wide districts. These are largely financed and mainly controlled by the mining companies themselves.

A very appreciable percentage of the copper mined in future will be put back into wire for electric windings and cables.

American Shoemaking.

R. B. Rogers, Editor.

Conditions in the shoe trade are, as in other industries, considerably unsettled by the European war. There are, however, indications that when new working conditions are perfected the shoe industry will have a prosperous season.

Regarding electrical devices, these are gradually coming into more general use in the shoe trade. Electrical heaters are being employed on many of the machines and the application of electric motors to individual machines is in evidence on some of the latter inventions.

The shoe industry is particularly adapted to the use of light motors, either applied to the line of machines or to individual devices. There is also a wide opportunity for electric heating and lighting devices. We believe the electrical development is in its infancy in the shoe trade, and that there will be a marked increase in the use of such devices during the next five or ten years.

Construction News.

H. W. Culbertson, Editor.

While building construction may not this fall be up to the high totals established in July because of the developments since that time, it is believed that it will be beyond anything that people have any idea of. Building in this country has been very active. The figures in the principal cities of the United States for July show an increase of 15 per cent over the corresponding period last year, and in Chicago the increase for July over the same month a year ago was 51 per cent. This last figure is a little beyond the normal for the reason that building had been held back by the brickmakers' strike. The demand for many classes of building in Chicago is excellent and for this reason construction should be maintained upon a fairly active scale.

Brick.

Frederick W. Donahoe, Editor.

The clay-products industry, so far as it is concerned in the manufacture of building materials—brick, hollow tile, etc., reflects the building activity of the country. Being made up of a host of small units, it "runs to cover" very soon after the receipt of information that some one thing or another has interfered with investment or speculative construction.

A feeling of timidity has cast a shadow over the industry for the past two years. The change in administration, the tariff "tinkering," the anti-trust legislation, the "war" with Mexico all helped to stop the enlargement of present plants and the building of new ones.

The war in Europe has made those who were, in a great part, convinced that these previous "troubles" were not so bad as they had anticipated, more convinced than ever that this is a good time to "lie low."

In the meantime, the product has been shipped out almost as fast as it was made, and prices have been satisfactory. Many plants will have larger balances in their banks at the end of 1914 than were there at the beginning of the year.

If, by that time, the war spectre is lain low, this money will be used for improvements that should have been made, and that would have been made, had it not been for "scare" piled on "scare."

Much of this improvement will be in the line of installing electrical equipment. So much has been printed on this subject, and the example of the efficiency of motor drives has been so thoroughly driven into the clayworker's mind, that he cannot fail to be interested in this movement toward cost-saving and plant economy, just as soon as he is sure that he can make an investment safely.

Knit Goods.

Benedict Fitzpatrick, Editor.

I have very little doubt that there will be an increased demand for electrical material in the knit-goods trade for the fall and winter.

The use of electricity as motive power has been growing with the expansion of the industry, and the outbreak of war in Europe is undoubtedly going to have a decided effect in the direction of promoting that expansion. A great number of mills are already preparing to add to their machine equipment, a

very large part of which will require electrical material for its operation.

Concrete-Cement Age.

Harvey Whipple, Managing Editor.

The situation is that there has been a slight slackening in building operations due to a feeling of uncertainty as to business conditions. The indications in our field are that conditions are very good—so good that there is now evident a return of confidence and business is certainly looking up.

The Coal Trade Journal.

F. W. Saward, General Manager.

We look forward to a very active fall and winter season in the coal trade. This is, in part, due to the fact that purchasing up to date has been on a sumewhat curtailed basis, the year's sales having been no more than last year's, although generally a 10 per cent increase is shown, and it is expected that a part, at least, of this growth will be attained during the remaining months of the year.

Export business, for which there now seem to be great possibilities, will offset much of the reduction in home demand. We doubt very much if there will be much increase in demand for electrical material and equipment in the coal industry, for during the recent months of dullness the principal coal-mining companies have been doing considerable in the way of installing new machinery, very largely electrical in character, with a view at once to reducing cost of production and being prepared, also, to care for the enlarged demand that is sure to eventuate in due course. It is our opinion, therefore, that if demand for electrical apparatus in the coal trade continues on recent or present basis that will be all that can be expected.

The Timberman.

G. M. Cornwall, Publisher.

The lumber business is steadily adopting electrically driven machinery in the manufacture of lumber. The results have been satisfactory and the future gives evidence of a still further increased use of electrically driven machinery.

The logging branch of the lumber business on the Pacific Coast has made some experiments with electrically operated logging engines, and the results have been satisfactory. With the steady increase in the development of electrical energy transmitted by commercial power lines, there is every reason to believe that the logging of the future in many sections of the Pacific Coast will be accomplished through the use of electrical equipment.

I consider that the reduction of the fire hazard by the use of electric logging engines, would in itself, be quite a feature in its favor.

Granite, Marble and Bronze.

George H. Collyer, President.

We do not believe the monumental business will be in any way affected by existing conditions; we believe there will be a normal amount of business.

The important factor bearing upon the monumental trade is the volume of agricultural products, and as this bids fair to be above the average amount, we see no reason why the monumental trade should not respond accordingly.

Electrical appliances are being installed by progressive manufacturers wherever power is obtainable. Many small retailers who heretofore have cut by hand are now using air tools operated by gasoline or electric motor.

Textile Manufacturers' Journal.

C. H. Clark, President.

While there are some differences of opinion in the domestic textile industry as to the date at which any marked improvement in business may be expected, it is the consensus of opinion that the curtailment of exports from European textile mills to this and other countries cannot fail to stimulate the domestic textile industry. That there will be some restriction of demand in the home market as a result of the European war is to be expected, but it is safe to assume that this will be more than counterbalanced by the effectual cutting off of imports from Europe. The latter in wool, cotton and knitted textiles had shown a radical increase under the Underwood tariff, and had resulted in not only forcing these branches of the industry to curtail operations, but had also seriously restricted profits. Today the textile industry is surrounded by a higher protective wall than ever before, and is certain to profit by demands from foreign markets whose previous principal source of supplies in Europe has been temporarily cut off. We are facing an era of low-priced cotton and wool and of relatively high-priced manufactured goods. If this country had adequate international banking facilities and a large merchant marine the textile industry would enjoy one of the greatest booms in its history. Even without such facilities, and with comparatively tight money the domestic textile industry is reasonably certain to enjoy a considerable period of increased activity and prosperity.

The Wood-Worker.

S. H. Smith, President.

Business in the wood-working machine and supply trade is, generally speaking, rather unsatisfactory at this writing. Better conditions are expected within a few months, however.

Wood-working plants are, we think, doing very well about installing electric equipment. They were slow to take it up, but during the last few years a very fair number of them have adopted electric drive. We believe the popularity of motors for operating wood-working machinery will increase as their advantages become better appreciated.

Implement and Vehicle Record.

As far as the outlook for trade in the hardware, implement and vehicle lines is concerned, naturally the trade is dependent to a very large extent upon the agricultural and crop conditions.

We are pleased to tell you that never in the history of the West, taken as a whole, have there been such excellent crops; as a rule the producers are obtaining good prices for their products.

We believe the West is in far better shape, both as far as business and crop conditions are concerned, than any other part of the country, if we are guided by our correspondents and the reports of our Eastern representatives.

Our own representatives who are in intimate touch with the jobbers and retail trade, report that stocks as a rule are quite low, and it is well known that for several months past, the merchants have not been buying more than they thought was necessary for their immediate requirements.

The European war should certainly make an increased demand for produce and crops.

We regard the outlook as being the best we have seen for many years.

The Contractor.

Charles P. Stivers, Associate Editor.

Perhaps no other industry responds more directly to the general condition of the country and to changes in the financial situation than contracting. A widespread feeling of optimism and confidence is marked almost immediately by a great number of construction projects; a period of depression and retrenchment is rapidly manifested by a lack of new work of magnitude.

So far as the United States alone is concerned today, indications would point to a coming season of great activity. The feeling of uncertainty which has prevailed during the past year has been largely dispelled. A few weeks ago, one of the most prominent firms in the country sent out a letter to the heads of public service corporations pointing out the ideal conditions for new construction work.

The recently granted increase in freight rates in Central Freight Association territory should have a decided tendency to induce the railroads to push to completion many important deferred projects. The splendid crop returns assured this year should effect general prosperity and, therefore, contracting. On the other hand, the European war will undoubtedly tend to make it more difficult to obtain capital at a low rate for construction projects. On the whole, however, the prospect is decidedly encouraging.

The demand for electrical equipment and material in the contracting field is continually growing. A great and varied amount of machinery is used by the contractor, much of it adapted to electrical operation. The development of hydroelectric projects is one of the branches of the profession which is growing most rapidly and which suffered least from the depression of last year.

The Price-Current-Grain Reporter.

J. Ralph Pickell, Editor.

In time of war, the handling of foodstuffs, especially grain and grain-products, is a most important industry.

The United States is especially fortunate this year in having produced a record-breaking wheat crop. We could export a million bushels of wheat per day between now and July 1, and

still have an abundance left for seeding purposes, for feeding and for human consumption, until the next crop is produced.

Foodstuffs, such as wheat, corn and oats, are the necessary commodities of speculation, because of the uncertainty of production. It matters not what you may think about it, or what I may think about it, or what we may try to do about it, grain has been and always will be, subject to the uncertainties of the seasons and therefore a speculative commodity.

So when the war was declared, involving Great Britain and the continental countries of Europe, those who handle grain in this country realized at once that the workers in the countries at war would be mobilized, that many fields would remain unharvested or be trampled by invading hosts, and that if war continued, the seeding of wheat and other grains in foreign countries would be greatly curtailed. Therefore the natural assumption of the men who handle food products was that war would create a tremendous demand for our surplus. Consequently, the markets advanced in Chicago, and in all other grain centers, five and ten cents per bushel, whereas a half-cent advance is usually reckoned a reasonable fluctuation in price.

The speculative markets are very sensitive to world conditions, so far as peace or war is concerned, even more so than to severe climatic conditions. It was not surprising, then, confronting the greatest war, in some respects, the world has ever known, that the wheat, corn and oats markets should materially advance.

On second thought, those who had wheat to sell soon found that it could not be exported. That is the condition this country faces today. So prices were correspondingly depressed.

The market, therefore, so far as corn, oats and wheat are concerned, may be expected to fluctuate widely.

There are two or three fundamental principles in this commercial situation which should be recognized. The first is that we have a surplus of food to sell, and England and the Continent need it. This means they will get it and we will profit thereby. The second fundamental principle to remember is that food prices have universally risen at the beginning of war between nations, and they have universally fallen when peace has been declared.

It would not be a wild exaggeration to say, then, that if the war is prolonged, wheat might attain a value of $1.50 per bushel or more. And when peace is declared, and Russia, which is conserving her supplies (and she has a large surplus for export), puts this surplus on the market, prices might be correspondingly depressed to even 75 cents per bushel or less.

From your point of view, this factor should be encouraging. More electrical devices are being utilized in grain plants, both in the country and in the terminal markets, than ever before. We have more grain to handle than we have ever had before. Therefore it is only logical to assume that facilities will continue to be purchased for handling this grain. Furthermore, the grain business is about as logical a business as one could choose in time of war, for men and animals must be fed. Prctically all business is bound to suffer in this country as a result of the war, but the cash handler of grain undoubtedly will suffer as little as any other one distributer of products.

Harness Herald.

John C. F. Jackson, Editor.

The harness and saddlery industry has been operated on conservative lines for the last two or three years. Crop disappointments during this time have had their effect and general depression, noticeable in all lines of business throughout the country, has noticeably checked operations. The high price of leather and the constantly rising market, have tended to keep production within limitations. The result of this situation is an absence of over-production, stocks in the hands of retailers are low, and the consumer who has withheld buying, is now in apparent need.

The year's bountiful crop, and the promise or realization of good prices, should invigorate buying by the consumer, and this means that the retailer must of necessity buy liberally. To supply actual needs should animate every branch of the industry. War troubles should stimulate rather than retard business. Saying nothing of the activities which naturally come on with brighter prospects, and greater realization of prosperity, the industry should look for a healthy business condition throughout the fall and winter. Fortification to meet an unprecedented demand—an unusual business boom, would in the pale of present conditions be merely exercising prudence.

Machinery.

Fred E. Rogers, Editor.

We regret to say that the machine tool business is depressed and has been quite seriously depressed for the past year. Many of the American machine tool builders have, however, enjoyed a prosperous trade abroad. The great European war, of course, has put an end to that business for the present.

We are optimistic as to the future, and believe that the United States has a great opportunity to achieve commercial supremacy in many fields. Whatever the outcome in the European struggle, hatred and prejudices will be engendered that will materially check the commercial advancement of the leading nations for years to come. South America offers an inviting field for American trade and with the development of our merchant marine, we should be able to soon develop a great trade in Latin America, provided we study and adopt the methods that have won success for the Germans in their dealings with these countries.

American Exporter.

Franklin Johnston, Publisher.

The practical elimination of Germany as an exporter of electrical equipment and machinery for the time being, will have a very marked effect on the electrical manufacturing industry in the United States.

In the present war situation we anticipate that British manufactures in electrical lines will continue their business under fairly good conditions, as there is no compulsory military service in England, and England will keep her merchant ships going, no matter what happens. In fact we believe that if the British navy were to be defeated, that British ships would still run to some extent. Germany on the other hand with her lack of free access to the ocean, the comparative smallness of her navy and the compulsory military service of nearly all able-bodied men, can neither manufacture nor ship. Hence the vast neutral markets of Latin America, the Far East, South America, etc., are depending upon the United States and Great Britain for their electrical supplies. Much of this business, once secured, will remain permanent, and it would seem to us that the coming months will see a marked activity, with a permanently increased export trade.

The Shoe Retailer.

James H. Stone, Editor.

As a result of the European war, tanners and shoe manufacturers are considerably at sea, and few are willing to make predictions as to the future costs of business, or of prices for hides and skins and shoes, because of the great uncertainties entering into the situation.

The leather industry is dependent upon France and Germany for large supplies of hides and skins, and also for dyes and chemicals used in the tanning of leather. The latter materials come almost exclusively from Germany. Sole leather has advanced about two cents a pound since the war started, and upper leather, such as calf skins, of which we import many millions of dollars' worth from Europe, have advanced from one to four cents per foot. Tanners are carrying no reserve stocks of raw hides and skins, and leather merchants have no large supplies of the finished leather.

Shoes are certain to advance in price; just how much no one can tell, in view of the uncertainty of prices for leather. The impression is general that there must be a minimum advance of at least $0.50 per pair on shoes that usually retail at $4 and upwards. This advance may not be felt immediately, because most manufacturers have anticipated their requirements for fall and winter shoes; but the advance is certain to be felt when dealers reorder on shoes, which they have now in stock, and also on the new shoes for next spring and summer.

In some of the shoe-manufacturing centers, the factories are running on a reduced schedule, but we do not expect that this condition will continue for any great length of time.

It would seem to us that with the great uncertainty that exists as to the duration of the conflict in Europe, together with the high price of materials, and the other items of expense that are affected by the war, that tanners and shoe manufacturers will be very slow to engage in building operations, that might call for the purchase of electrical supplies; at least not for two or three months, by which time it is hoped that the situation will have become much clearer.

The American Hatter.

Robert J. Patterson, Editor.

The hat-manufacturing trade has gone through a period of depression that in its direct effect is the worst that the industry has ever experienced,

and as there is little or no material evidence of improvement, manufacturers are not investing in new equipment beyond absolute necessity.

The European war will create a temporary business disturbance here, but after that is over the record crops should prove the foundation for the return of industrial activity which is the necessary element for the return of prosperous conditions in the hat-manufacturing industry.

India Rubber World.

J. P. Lyons.

In a general way, we can say that the trade was moving along comfortably until the war broke out, and since that time has been in a very unsettled condition owing to the fact that all the crude rubber used by American manufacturers is of course imported, about half of it coming from Brazil and the other half from the Far East, and very little of it has reached port since the first of the month. If the war continues the result will be a tremendous falling off of all rubber manufactures.

Motor.

A. C. Johnston, Associate Editor.

The fact that the export markets of the world are now practically at the mercy of America leads us to believe that after a preliminary period of preparation our automobile industry should embark on another era of remarkable prosperity. In so far as the use of electrical appliances by the motor industry goes, you undoubtedly know that more and more electrical devices are coming to be installed on modern motor cars every year. There seems to be no reason for thinking that this movement will not continue.

Grain Dealers' Journal.

Charles S. Clark, Manager.

With the largest crop of wheat ever grown in this country and the strongest demand for wheat ever developed in Europe, because of short crops in Austria, Germany and France in addition to the war, and similar conditions affecting the oat market, the grain trade should be kept busier during the coming winter and the grain dealers be more prosperous than ever before.

The refusal of the banks to advance money to anyone for a couple of weeks has brought every dealer to his senses and forced him to realize the importance of the European scarcity and the European war; consequently every dealer all along the line, as well as the farmer, is going to be alert for every opportunity to get his share of the increased price, which is justified by the increased demand. Last Monday (August 17), the New York bankers loosened up their cash boxes and began to buy foreign exchange, so that our grain exporters could obtain their money promptly, and since they have taken this action, the wheat market has risen, and the predictions are for much greater rises.

Unless the corn, barley and rye crops fall short of the government's August figures, the grain trade will have the most prosperous year in its history.

As you no doubt are aware, the elevator men everywhere are equipping their plants with incandescent electric lighting systems, so as to eliminate the danger of dust explosions, which have resulted in the destruction of enough plants during recent years to prove that it is far more expensive to do without incandescent electric lights than it is to use them. Many elevators are also putting in electrical power, so as to take advantage of the cheap power offered by the different interurban traction lines. With the rising markets, it should be an easy matter for grain dealers everywhere to make more money than usual, and like machinery users in other lines of trade, they will make improvements in their mechanical facilities whenever they have the money to spare.

The Blacksmith and Wheelwright.

A. A. Hill, Editor.

Every indication points to unusually active business the coming fall and winter on the part of our readers.

The blacksmith and wheelwright business depends more or less upon the prosperity of the farming class, and with our generally large crops and the high prices that are likely to be received from these crops, the farming communities will be more prosperous in the immediate future than they have been for a good many decades.

It is true that the automobile has interfered with the horse-drawn vehicles in many localities, but this will in no way injure the blacksmith and wheelwright for the automobile gives him as much work as the horse-drawn vehicle used to do.

Of course any prosperity of the blacksmith and wheelwright is reflected in the greater employment of electrical materials and equipments.

The American Carpet and Upholstery Journal.

John R. Kendrick, President.

The carpet, linoleum, rug and curtain mills of the country are moving along normally despite the confusion which is created by the cessation of industries abroad on which they depend to some extent for raw materials and ingredients in general. There can be no reason assigned for lethargy or a "watchful waiting" attitude on the part of our mills. The consumers are here and they will want the goods this coming fall and winter. We have been much perplexed by the presence of cheap German linoleums in this country. This trade has ceased and our own mills will get the business which rightfully belongs to them. They are indeed getting it now, and will have a bigger trade than ever this fall with no foreign ghosts to give us fright.

The largest jobber in Philadelphia of upholstery goods—a Republican and member of the Union League—told me yesterday that he had just hastened home from the West and ordered our domestic mills here to "copy" the foreign styles which he had been carrying and of course carrying to the detriment of American mills. Germany has been sending a great lot of cheap upholstery goods here which has hurt us no little.

The action of Congress in providing us with shipping without regard to its place of construction cannot but help our trade both at home and abroad.

In short, it is our belief that the American mills of all kinds and types have reached that moment in the "tide" of affairs, which "taken at the flood," will land us on an eminence of prosperity from which none can pull us down.

There ought to be more electricity consumed in the mills we represent than is the case. Nevertheless, there is a lot of equipment going to be needed in our direction.

National Laundry Journal.

W. T. Williams, Managing Editor.

Conditions in the laundry industry are at this writing normal and stable, according to reports from our correspondents. The prices of laundry supplies (soap, starch, neutral soda, etc.), have not advanced materially. As all of these things are made in this country, imported supplies are not necessary.

The laundry-machinery manufacturers report satisfactory conditions in this country. The domestic consumption of laundry machinery is always increasing and, therefore, the small amount of export business which has been lost will be equalized.

Concerns which sell electrical equipment to the laundry owners direct, or to the machinery manufacturers for connection to machines, or for resale, need not apprehend any falling off of orders from those sources.

The American Thresherman.

P. T. Rose, Assistant Editor.

Our readers are all threshermen and power farmers and naturally do not use a great deal of electrical equipment. The only market among these people for electric goods is the line of small electric lighting plants. These are coming in use very rapidly in the country, and with the prosperity incident to good crops and fair prices the demand this fall and winter will be greater than ever and in the aggregate will amount to a good many million dollars.

The Cement Era.

E. S. Hanson, Editor.

The development in connection with the concrete and cement industry which will be of most interest to your readers is the increased use of electricity for motive power. This is, as you know, an industry which has had a phenomenally rapid development within the past few years, and in its first stages people resorted, in most cases, to a temporary or makeshift method until the adaptability of concrete to the various new uses for which it was being tried out, could be fully determined.

That concrete is a material admirably suited to meet a large number of the demands of the present time is settled beyond question. The industry is therefore right now in a stage of economic development. It is being practically reconstructed along lines of efficiency and permanency. One of the most noticeable instances of development is found in the manufacture of concrete products such as blocks, sewer pipe, ornamental work, etc. It has been a comparatively short time since these were manufactured in improvised sheds or old barns in backyards. In many cases all the

work was done by hand, at a very small initial outlay, to be sure, but at an immense competitive operating disadvantage.

At the present time all of the more enterprising manufacturers of this class of product have well designed plants, built especially for the purpose and equipped with all possible labor-saving machinery. While in all the newer plants the curing of these products is done by steam, necessitating the installation of a steam boiler, there is a growing tendency to use steam for curing and heating only, installing electric motors for motive power. In one plant recently visited I found three electric motors doing all the work, even though the current to supply them had to be brought from a larger town several miles distant from the plant.

There is a constant effort, too, to apply American inventive genius to the reduction of the amount of hand labor that has been necessary to this class of work. This has resulted in the development of the electrically driven driven tamper, the almost universal use of machine mixers for concrete, many of which are electrically driven, and the production of larger and larger machines for the manufacture by mechanical means of concrete sewer pipe and drain tile.

On large construction work also there is a tendency to develop more and more efficiency in the construction plant, and wherever the location of the work makes it possible the use of electricity for motive power is coming into greater and greater favor.

All that has been said relates to the *use* of cement. In the *production* of cement also electric installations are much more common than formerly, practically all of the plants which have recently been constructed being equipped with electric installations.

Monumental News.

H. C. Whitaker, General Manager.

The monument industry both in granite and marble is better throughout the United States at the present time than it has ever been before, and the outlook for fall and winter is very promising. There has been a marvelous development in this business during the past five years, not only in improved facilities for quarrying and manufacturing, but in the production of a higher standard of art in cemetery memorials.

Electrical equipment has, within a very recent period, come to be the main dependence in the quarries and manufacturing plants at nearly all of the leading granite and marble centers, and it is only a matter of time when they will all be operating with electric power. There are also about 4,000 retail monument dealers throughout the United States who operate small plants, and they too are coming to see the advisability of installing electricity for their air compressors and polishing machines.

It would be difficult to estimate with any degree of accuracy the probable demand for electrical equipment in the various branches of this industry during the coming fall and winter, but it is safe to say that your people will undoubtedly notice an appreciable increase unless all the present signs should prove to be misleading.

American Paint and Oil Dealer.

Allen W. Clark, Editor.

This summer, just before the European cataclysm, the prospects in the paint trade as reported by dealers and manufacturers throughout the country were more promising than ever before in the history of the trade, this being largely due to the highly satisfactory year just closed, to unexampled crop conditions, and to recent constructive national legislation.

I am writing this two weeks after England's declaration of war on Germany, during most of which period I was in the East, where I noted and shared the general daze that fell upon the business community then. Before returning home, however, marked confidence and optimism in American business conditions and prospects had become obvious, while here in St. Louis the big crops and the enthusiasm of the business men of the West and South have produced the most optimism and energy that I have seen manifested here in a quarter century. This spirit is fully shared by the paint trade, which like the electrical industries, is so closely allied with the building trades that no sound basis for such confidence could exist without the general belief that construction and improvement must go on apace with domestic conditions so fundamentally good.

Lumber Trade Journal.

James Boyd, Editor.

We are not able to give you any details regarding the demand for electrical equipment among the lumber companies of the South. We believe, however, that it will be good. It will depend upon the conditions of business enjoyed by the lumber companies. If they have a good business they will be liberal buyers both for replacement, betterment and new installations.

Before war was declared conditions were favorable to a large demand for lumber this fall and winter. The market began to improve in the early part of July both as to demand and prices due to the conditions of crops, which caused the retailers to begin to stock up. The war has had no effect on the volume of the crops, consequently the demand should be as great as if there had been no war.

We believe that the lumber business will be better on account of the war than it would have been if it were not declared. The farmers are getting more money for their crops. They will consequently have more to use in making improvements.

In the manufacturing towns plants will be running on two or three shifts in order to take care of the demand that can be traced to the war. There will be plenty of employment and plenty of money, so that furniture factories and other woodworking industries will find an increased sale for their output. Already box makers are noticing a large increase in business. With an increase of demand for wood products the volume of the lumber consumption will be so large that it may be necessary for the mills to operate nights which will cause the need of more electrical equipments. When such conditions prevail a great many projects for new mills that have been dormant will be revived and put into effect.

Furniture Manufacturer and Artisan.

J. Newton Nind, Editor.

While the trade in furniture was far below the normal the first half of the current year, and was not as large as usual, in volume, during the July sales, there was a general belief that the trade during the fall months would be satisfactory.

This belief was based on the good crop prospects, but was set at naught by the outbreak of the war in Europe. This has caused dealers in some instances to cancel orders, and in many more instances to withhold orders. The war imposed unusual conditions upon manufacturers.

We do not export much furniture, but we do buy a great many things which enter into furniture making, in foreign countries. Mirror plate is bought in large quantities from Germany and France. There has been an increase in imports since the change in the tariff, but, of course, since the war, these have been all off.

The price of American mirror plate has been advanced, and if the trade in furniture becomes anywhere near normal, the American factories will have a great difficulty in filling their orders, and the prices will rule very much higher.

Aniline dyes are largely used in finishing, as well as in manufacturing tapestries now being used by the manufacturers of upholstered furniture. Imports of tapestry are likely to be held up. Burlap, varnish and shellac, bought from the German markets, must be sought for elsewhere.

Factories, which have been making hall clocks in which German movements are largely used, have been compelled to refuse orders. In fact, at this writing, the furniture trade hardly knows where it is at.

The exhibitions are held in the principal markets during the month of July, and immediately following these exhibitions, the salesmen go out on the road to visit the dealers who did not come to market. They also expect to get confirmations on memorandum orders placed during the market season.

The salesmen who went on the first trips met rebuffs in many places, particularly in cities, because their first trip was simultaneous with the announcement of the European war. Since, then there seems to have been more restoration of confidence, but the manufacturers are not looking for even the normal fall trade, although it is certain that dealers will not be able to buy their furniture at the listed prices made at the July shows, because of the increased cost of mirror plate, and other things which have heretofore been bought in Europe.

The makers of metal furniture, including brass and iron beds, will have a wider market for their product, if the movement for the restoration of our merchant marine succeeds.

Hardwood Record.

E. W. Meeker, Managing Editor.

The possibility of demand for electrical material and equipment in the industries to which *Hardwood Record* caters is still unquestionably undeveloped—that is, its full possibilities have nowhere nearly been realized.

Taking the sawmill end of the business, the policy until recent years has always been to erect almost any kind

of a plant and to install such equipment as would manufacture lumber speedily and as accurately as possible. However, with increasing cost of timber to be reckoned with, a different attitude towards the character of equipment has been manifest to the extent that today the average lumber manufacturer operating with an assured supply of logs for some time to come is concentrating his attention not only on an accurately manufactured product, but as well on the economical production of his stock. He is compelled to do this, of course, primarily because of increased cost of timber and also because labor costs are increasing materially.

The demand, then, for electrical equipment in sawmills is really only in its infancy, there still being two distinct factions, one favoring electrical equipment and the other being opposed to it. This development (if the electrically operated sawmill is proven to be *the* sawmill) must become more general with the increased cost of the raw material, the increasing wages of labor, and the increasing disposition on the part of manufacturers in all lines to provide for their workmen pleasant and safe surroundings and the pride which they take in maintaining plants which can rightfully be spoken of as models in their line.

In the woodworking end, in a way, the same general statements can be made, although this class of manufacture has, of course, progressed further than has the manufacture of lumber in improving the general efficiency of the plants. However, there is very material room for further improvement and I believe there is a very active interest in electric equipment.

In these fields, of course, unfavorable business conditions have more effect in retarding the demand for electrical equipment than in those lines in which this equipment is already a well established factor. The reason is, of course, that such equipment necessarily represents a complete departure from former methods in machinery and a very considerable outlay in changing over. Thus when sawmills and woodworking plants are operating only partially or shut down altogether, the possibility of interesting their owners in electrical equipment is not so favorable as during periods of general activity.

Before the European complications had set in, the general tone of the hardwood producing and consuming trades was distinctly quiet, with a fairly uniform level of prices maintaining for hardwood lumber. The attitude at that time was, however, most decidedly optimistic and there had already been felt a stimulus in the fall business, every indication pointing to a satisfactory condition of trade.

Recent developments have, however, somewhat altered the general aspect, particularly in the South where are located a considerable number of large lumber manufacturing institutions who depend to a considerable extent for their business on European markets. These markets are now, of course, completely shut off and there has been some little disposition to view this development with alarm without pausing to consider the possibilities of opening up a similar demand in other quarters. That such possibility actually exists, however, we have demonstrated by an exhaustive investigation which we have reason to believe will result in turning a considerable quantity of hardwood lumber from European markets to equally desirable markets in other countries that will take care of any surplus that might result from diverting this export lumber to the domestic markets. It seems entirely likely that in cases where this possibility is not taken advantage of, such mills will shut down, which, of course, will obviate the possibility of their disorganizing the domestic business by dumping their export lumber in this country. Thus two possibilities present themselves: Either the American hardwood manfuacturers will simply substitute for their European markets desirable markets in other sections or in the event of their failing to take advantage of this opportunity they will close down their mills, thus maintaining a fair balance between domestic production and consumption of hardwood lumber. In the latter event the only mills affected would be those the majority of whose business is export and the effect on the domestic situation would probably not be unduly serious.

As to domestic trade, it is, of course, an uncertain proposition to endeavor to forecast accurately but recent furniture exhibits gave a fairly satisfactory indication as to fall hardwood trade. Coupled with this is the generally prosperous condition which must necessarily result from realization of good prices for farmers' grain crops. That this condition will become a fact is absolutely assured by the security of provisions abroad and the absolute necessity for foreign countries going to any length to provide grain for their soldiers and civilians. We also have as a favorable indication the fact that the railroads are under the absolute necessity of buying lumber to provide new equipment and to rehabilitate old equipment for the removal of the grain crop. This absolutely must come soon and there does not seem to be any possibility of their getting out of this obligation. This likelihood is made more apparent by the partially favorable decision recently handed down by the Interstate Commerce Commission. We cannot fail to gain a measure of satisfaction from the better price tone which is prevailing regarding steel.

Lumber business is always one of the first to be affected by general depression and one of the last to recover. However, it is a business which is affected by any favorable development that renders the country more prosperous through other means, hence if business men in other lines maintain their prosperity by taking advantage of foreign opportunities offered and if our domestic affairs shape up in such a way that farmers in general will be in a prosperous condition and a buying mood, there is no reason why lumber should not be good property in the fall months.

The Modern Miller.

C. M. Yager, Editor.

The milling industry at the present moment is very active with the prospect of a large domestic business, and if foreign exchange is available and war risks assured by the British Government, it is certain that there will be a large export trade in flour. Under these circumstances prosperous conditions should prevail in the milling industry, and there is no reason why all the necessary equipment in electrical supplies should not be continued. As a matter of fact, when the mills are particularly busy, they are not inclined to install much new machinery, but covering electrical supplies of course it is essential that the mills shall supply themselves with very necessary equipment. Because of prosperous conditions in the milling industry, we feel that trade in milling machinery lines should be large.

The Operative Miller.

J. F. Mueller, Editor.

From all appearances flour and cereal millers are greatly favoring the installation of electricity for power. We are of the opinion that the fall and winter business in this connection will keep up as well as ever. There is no line of industry in which the subject of power is taken more closely into consideration than in connection with milling.

Lumber World Review.

Bolling Arthur Johnson, Editor.

My opinion is that building in all the large centers of the United States is going to increase. I base this opinion from some 200 letters in my possession and from several scores of interviews with contractors and builders in this city. I likewise believe that this condition will prevail for at least two years.

There is no reason why this disastrous war in Europe should not be a decided advantage to the commercial life of the United States, as ghoulish as the idea is. The heavy expenditure incident to foreign travel must necessarily cease for a time, and the people of this country will give some attention to "seeing America first," and they will also improve their property and extend their business in many directions. I also believe that the export trade will revive much more rapidly than many at first thought.

The increase in electrical equipment of saw mills during the past three years has been almost phenomenal, and that is going to be on the increase. Everything points to that.

In my opinion there will be just as many saw mills built during the coming year as during the past year. The building of more mills than necessary has been one of the weaknesses of the lumber trade, and I doubt whether anything less than a civil war could stop it. I am chagrined to have to record that out of the frenzied desire of lumbermen to acquire new mills and more mills and bigger mills there has arisen nearly all of the troubles that beset the lumber industry of this country for the past ten years. The lumber manufacturers of the country have made no money for the past five years. Those lumbermen who have made money have not done so by the sawing of the trees but by the increase in the value of the stumpage or trees remaining standing.

There is a general misapprehension as to the extent and life of the lumber trade. In my opinion there is enough hardwood to last for several hundred years, and the soft woods will last away into the twenty-first century.

It is very possible that the closer relations which are coming into existence between the lumbermen and the Forest service of this country looking toward scientific lumbering, will perpetuate the life of lumber production indefinitely.

From what I can gather from many newspapers and from the vast correspondence coming into this office I look for a healthy condition of business in your line as well as in our own, for the coming fall and winter.

National Harness Review.

Jefferson Jackson, Publisher.

We think on account of the war scare that prospects in the saddlery trade are very poor, for any prospective new business; for the reason that our trade seems inclined to do nothing in the way of purchasing except for such articles as are absolutely necessary. However, there is a field in our line for the sale of individual electric motors for running the machinery of manufacturing plants. Quite a number are using individual electric motors to run the various machines and hundreds of others could, no doubt, be induced to by the proper efforts on the part of manufacturers of electric motors.

The Colliery Engineer.

Rufus J. Foster, Managing Editor.

If it was not for the general disturbance of business by the great European war, the conditions in the coal trade would be practically normal with about the same volume of business as last year, or possibly a slight decrease in demand. What effect the war will have on the industry cannot be accurately foretold, but we believe that the foreign demand for American coal will be heavy and the trade will be greatly stimulated if facilities for transporting the coal to foreign ports are available. Many neutral foreign nations heretofore largely dependent on Welsh coal must, of necessity, turn to the United States, and if the export of coal to belligerent nations is not a violation of neutrality, there will undoubtedly be a considerable demand from those nations whose vessels can safely transport it. Therefore, in our opinion the coal business for the fall and winter will be equal to that of last year and possibly much better.

If the coal business is normal there will be not only a normal demand for electrical equipment at coal mines, but an increased demand due to the wider use of electric power. Naturally if the demand for coal should be above normal there will be an increased demand for electrical machinery and materials.

The Manufacturing Jeweler.

Walter B. Frost, Editor.

The jewelry business has been very dull all the year up to now. Purchases from the factories have been so small through the winter, spring, and summer so far, that it had been quite generally predicted that a good fall business was certain. The sudden and general declaration of war in Europe has so upset calculations that it is difficult now to predict. The first effect of the war, as far as manufacturing jewelers are concerned, is to accelerate the demand for cheap jewelry, such as is made in Germany and Austria for export. On the other hand it has brought the manufacturers face to face with a peculiar problem, namely the difficulty of securing cheap imitation stones which are mounted into cheap jewelry, these being chiefly made in Austria. It is expected, however, that changes in style will overcome this difficulty to some extent.

The fact that the western producers of foodstuffs are likely to receive higher prices than usual for their products encourages the eastern manufacturers of jewelry to believe that there will be a larger demand for their wares this fall than would have been the case had conditions not suddenly changed.

Farm Machinery.

Frank E. Goodwin, Associate Editor.

The farm-implement industry is in very buoyant spirits, owing to the record crop of wheat, and good yields of all other farm products. Some scattered localities have reported losses from drought, but losses are always noted in every year, and this no matter of wonderment, except it is a little wider spread than usual.

A careful review of present feeling would show that 32 per cent declare present business is poor; 38 per cent fair; 22 per cent good and 8 per cent excellent. Prospects for the balance of the current year are 20 per cent poor; 43 per cent fair; 27 per cent good, and 10 per cent excellent.

If the European war continues for three months longer farmers will sow a record acreage of wheat this fall, as it is generally known that the United States must furnish a great amount of wheat for export. An effort will be made to plant much corn another year; ditto oats.

The writer looks for a determined effort toward intensive farming another year. This will necessitate the purchase of much farming machinery and implements.

If shipping arrangements are completed so that goods may be quickly and economically transported to South America, every implement factory in the country having export facilities should reap a rich harvest with the southern continent.

Our company believes in the golden future of agriculture, and is of the opinion that great strides toward prosperity will be made during the coming few years. We see no clouds in the horizon of trade.

The Clay Worker.

Theodore A. Randall, President.

We presume the demand for electrical apparatus for use in clay plants will continue to increase as it has of late years. There is a decided tendency towards the adoption of electrical power and apparatus, especially for new plants. For instance, Eben Rodgers, president of the National Brick Manufacturers Association, is building a new plant near St. Louis, which will be thoroughly modern in construction and equipment. The structural work will be wholly of steel and brick and the plant throughout will be operated by electricity, the current being supplied by a local power company.

In common with all other industries, the clay lines are but moderately active just now. There is a fair volume of business generally throughout the country. If, as some think, the war has a tendency to stimulate production in this country, the brick, tile and pottery interests will be affected beneficially to some extent of course. Otherwise, I anticipate a normal year. I feel sure that when the record is made up that the volume of business transacted will be about the same as that of last year, which was slightly above the average.

The Weekly Implement Trade Journal.

George F. Massey, Managing Editor.

As you know, the latest government estimate places the yield of winter wheat in Kansas at 163,000,000 bushels, and Kansas is only one comparatively small part of the Missouri and Arkansas valleys. The wheat yield in the much-touted Canadian Northwest this year is now estimated at 135,000,000 bushels.

If comparisons are odious, this one must be particularly so to a Western Canadian. Virtually a third of the entire production of wheat in this country was grown this year in the four states of Kansas, Nebraska, Missouri and Oklahoma. It follows then that the Southwest is expecting great things in the way of fall business. The general movement, of course, will be even more accelerated if the yield of corn turns out to be anything like normal. At present rains are needed for the proper maturity of the corn crop, but with a little more precipitation it is certain that the production of corn this year will do all that is expected of it.

Just at this time there is nothing like a boom on, although, on the other hand, the general feeling is that of security and gratitude that the United States is not involved in the world war. There is a decided disposition on the part of the farmers to repeat their wheat success next year and to plant a large acreage to that grain. As a consequence the movement of plows, both disk and moldboard, as well as farm wagons is very considerable. In spite of certain things that appear on the surface to be adversities, there is no reason for expecting anything but a substantial prosperity in the implement and hardware field.

Analysis of Germany's Electrical Export Trade.

It is not generally realized to what an enormous extent Germany's exports of electrical machinery and apparatus have been rising during the last two decades, says *Electrical Engineering* In 1913 the value of these exports was $69,000,000. Of this $10,700,000 was to Russia, Austria and France. During the war these exports will be practically nil. In considering the effect of the war on the electrical industry, account must be taken of the markets which are opened owing to Germany's inability to supply. A large proportion of this export trade of Germany can be ours if we take the proper steps to obtain it.

A German official return contains a list of Germany's chief customers for its export trade under classified headings, and indicates the proportion which each country has been buying from Germany.

It is seen, for instance, from the figures relating to electrical machinery and apparatus given below that in 1913 British South Africa bought over 1,000 tons of generators, motors, and transformers, about the same weight of cable, 29 tons of metal-filament lamps, and 14 tons of electrical measuring instruments and meters from Germany. Belgium has, it will be noticed, been an excellent customer of Germany for electrical goods. Argentine and other South American countries are good buyers. The amount of cable exported by Germany has been enormous in recent years. The magnitude of the figures relating to electric lamps should

give energy to our lamp manufacturers.

The publication of these statistics should encourage all our electrical manufacturers to lose no time in making an attack on Germany's markets abroad. Although the statistics do not give the values of the exports to each country, but only weights, yet the total weights and total values are given for each item, and it is therefore possible to make a very fair estimate of the value of each particular branch of the trade in every country.

Since other countries have had their supplies of electrical goods from Germany suddenly cut off, they must buy at any rate a certain proportion of them elsewhere. Switzerland, Italy, and England, with ourselves, are the chief producers of electrical apparatus and machinery able to continue manufacture. It behooves us, therefore, to lose no time and to see that we get as much business as possible to make up for the business lost, and to keep our manufacturing works going so as to avoid distress.

The business momentarily lost by the war is, of course, difficult to estimate, but so far as the electrical industry is concerned, we believe that more harm will be done through the disorganization immediately following the outbreak of war, and the difficulty in the financial position, than by the actual loss of trade.

The rapid increase in electrical exports from Germany is shown by the following figures of value, which apply to the first six months of the respective years:

1910	$24,600,000
1911	23,800,000
1912	24,900,000
1913	30,300,000
1914	35,600,000

The total exports of electrical machinery and apparatus from Germany to all countries in 1913 were of a total value of 290,482,000 marks, or about $69,000,000, and the total weight of these was 133,855 metric tons.

Generators, Motors, Transformers, and Choking Coils.

Machines, etc., up to 25 kilograms in Weight.—Total weight, 741 tons. Value, $700,000. Number of articles, 78,039. Chief countries exported to: Belgium, 41 tons; France, 59 tons; Great Britain, 58 tons; Italy, 41 tons; Austro-Hungary, 120 tons; Russia, 182 tons; Switzerland, 41 tons; Spain, 34 tons.

Machines, etc., from 25 to 100 kilograms in Weight.—Total weight, 3,146 tons. Value, $1,760,000. Number of articles, 57,356. Chief countries exported to: Belgium, 198 tons; France, 236 tons; Great Britain, 268 tons; Italy, 147 tons; Holland, 238 tons; Norway, 60 tons; Austro-Hungary, 532 tons; Russia, 505 tons; Switzerland, 106 tons; Spain, 243 tons; Japan, 63 tons; Argentine, 106 tons; Brazil, 101 tons.

Machines, etc., from 100 to 500 kilograms in Weight.—Total weight, 7,753 tons. Value, $3,500,000. Number of articles, 36,528. Chief countries exported to: Belgium, 641 tons; Denmark, 147 tons; France, 350 tons; Great Britain, 760 tons; Italy, 347 tons; Holland, 533 tons; Norway, 222 tons; Austro-Hungary, 613 tons; Portugal, 76 tons; Roumania, 116 tons; Russia, 809 tons; Finland, 157 tons; Sweden, 142 tons; Switzerland, 108 tons; Spain, 574 tons; British South Africa, 98 tons; Japan, 128 tons; Argentine, 491 tons; Brazil, 532 tons; Chili, 192 tons; Mexico, 110 tons; Australia, 129 tons.

Machines, etc., over 500 kilograms in Weight.—Total weight, 25,639 tons. Value, $7,780,000. Number of articles, 11,919. Chief countries exported to: Belgium, 2,168 tons; Denmark, 267 tons; France, 1,214 tons; Great Britain, 1,228 tons; Italy, 1,613 tons; Holland, 1,150 tons; Norway, 1,270 tons; Austro-Hungary, 842 tons; Portugal, 229 tons; Roumania, 696 tons; Russia, 2,171 tons; Finland, 238 tons; Sweden, 443 tons; Switzerland, 573 tons; Spain, 2,239 tons; British South Africa, 906 tons; India, 547 tons; China, 266 tons; Japan, 2,419 tons; Dutch India, 362 tons; Argentine, 1,387 tons; Brazil, 1,144 tons; Chili, 630 tons; Mexico, 457 tons; Peru, 124 tons; Uruguay, 158 tons.

Separate Armatures and Commutators.

Total weight, 4,603 tons. Value, $1,910,000. The chief countries exported to: Belgium, 246 tons; France, 223 tons; Great Britain, 328 tons; Italy, 377 tons; Holland, 294 tons; Austria, 597 tons; Russia, 664 tons; British South Africa, 93 tons; Japan, 328 tons.

Accumulators and Parts.

Total weight, 6,452 tons. Value, $1,400,000. The chief countries exported to: Denmark, 823 tons; Holland, 892 tons; Norway, 632 tons; Sweden, 878 tons; Switzerland, 211 tons; Japan, 323 tons; Argentine, 622 tons; Brazil, 228 tons; Chili, 531 tons; Austria, 41 tons.

Cable.

Total weight, 47,591 tons. Value, $9,550,000. The chief countries exported to: Belgium, 5,305 tons; Denmark, 1,025 tons; Great Britain, 1,073 tons; Italy, 522 tons; Holland, 6,955 tons; Norway, 3,565 tons; Austria, 26 tons; Portugal, 240 tons; Roumania, 567 tons; Russia, 159 tons; Finland, 473 tons; Sweden, 2,281 tons; Switzerland, 67 tons; Spain, 720 tons; Turkey, 175 tons; Egypt, 234 tons; British South Africa, 1,195 tons; China, 507 tons; Japan, 3,724 tons; Dutch Indies, 3,616 tons; Argentine, 6,835 tons; Brazil, 425 tons; Chili, 594 tons; Mexico, 301 tons; Uruguay, 516 tons; Australia, 691 tons. In addition 4,739 tons of submarine cable was exported.

Arc Lamps and Mercury-Vapor Lamps.

Total weight, 595 tons. Value, $695,000. Number of articles, 51,838. The chief countries exported to: France, 18 tons; Great Britain, 74 tons; Italy, 36 tons; Austria, 40 tons; Russia, 138 tons; Argentine, 105 tons; United States, 25 tons.

Arc-Lamp Carbons.

Total weight, 7,051 tons. Value, $2,390,000. The chief countries exported to: Belgium, 555 tons; France, 387 tons; Great Britain, 1,740 tons; Italy, 610 tons; Holland, 214 tons; Austria, 428 tons; Russia, 243 tons; Switzerland, 107 tons; Dutch Indies, 69 tons; Argentine, 437 tons; Brazil, 83 tons; Canada, 98 tons; United States, 1,312 tons; Australia, 118 tons.

Spare Cases and Globes, etc., for Arc and Mercury-Vapor Lamps.

Total weight, 85 tons. Value, $105,000. The chief countries exported to: France, 9 tons; Great Britain, 6 tons.

Projectors and Reflectors.

Total weight, 283 tons. Value, $475,000. The chief countries exported to: Great Britain, 25 tons; Austria, 21 tons; Russia, 60 tons; Japan, 48 tons; United States, 2 tons.

Metal-Filament Lamps.

Total weight, 2,114 tons. Value, $10,980,000. Aggregate number of lamps, 48,264,231. The chief countries exported to: Belgium, 107 tons; Denmark, 61 tons; France, 100 tons; Great Britain, 148 tons; Italy, 155 tons; Holland, 34 tons; Norway, 68 tons; Austria, 233 tons; Portugal, 15 tons; Roumania, 16 tons; Russia, 325 tons; Finland, 35 tons; Sweden, 74 tons; Switzerland, 96 tons; Spain, 104 tons; British South Africa, 29 tons; India, 13 tons; China, 39 tons; Japan, 47 tons; Argentine, 83 tons; Brazil, 77 tons; Canada, 16 tons; Chili, 46 tons; Cuba, 18 tons; Mexico, 30 tons; United States, 14 tons; Australia, 18 tons.

Carbon-Filament and Nernst Lamps.

Total weight, 242 tons. Value, $813,000. Number of lamps, 7,916,003. The chief countries exported to: Belgium, 16 tons; France, 17 tons; Great Britain, 45 tons; Italy, 16 tons; Austria, 16 tons; Russia, 43 tons; Argentine, 16 tons; Brazil, 8 tons; United States, 2 tons.

Telegraphic Apparatus. (Exclusive of Wireless.)

Total weight, 137 tons. Value, $234,000. The chief countries exported to: Holland, 9 tons; Russia, 31 tons; China, 8 tons.

Telephonic Apparatus. (Exclusive of Wireless.)

Total weight, 957 tons. Value, $2,100,000. The chief countries exported to: Belgium, 66 tons; Denmark, 32 tons; France, 74 tons; Great Britain, 131 tons; Italy, 123 tons; Holland, 62 tons; Austria, 68 tons; Roumania, 21

tons; Russia, 130 tons; Switzerland, 47 tons; China, 25 tons; Argentine, 27 tons; Brazil, 25 tons.

Electrical Fuses, Cutouts, Bells, Signaling Apparatus, Etc.

Total weight, 1,048 tons. Value, $910,000. The chief countries exported to: Belgium, 106 tons; Denmark, 61 tons; Great Britain, 186 tons; Italy, 45 tons; Holland, 58 tons; Austria, 40 tons; Russia, 169 tons; Sweden, 49 tons; Switzerland, 42 tons; Argentine, 76 tons; United States, 20 tons.

Apparatus for Wireless Telegraphy and Telephony.

Total weight, 277 tons. Value, $400,000. The chief countries exported to: Great Britain, 41 tons; Austria, 13 tons; Argentine, 11 tons; United States, 24 tons.

Electrical Devices for Lighting, Power, Etc.

Total weight, 21,553 tons. Value, $18,000,000. Among the countries exported to: Belgium, 1,465 tons; France, 1,121 tons; Great Britain, 1,441 tons; Italy, 1,205 tons; Austria, 1,992 tons; Russia, 2,924 tons; British South Africa, 273 tons; Argentine, 1,520 tons; Australia, 122 tons.

Electromedical and Dental Apparatus.

Total weight, 610 tons. Value, $1,115,000. Among the countries exported to: Belgium, 29 tons; France, 27 tons; Great Britain, 51 tons; Italy, 22 tons; Austria, 113 tons; Russia, 119 tons.

Electrical Measuring Instruments, Electricity Meters, and Parts.

Total weight, 3,321 tons. Value, $5,890,000. The chief countries exported to: Belgium, 129 tons; Denmark, 134 tons; France, 184 tons; Great Britain, 275 tons; Italy, 375 tons; Holland, 91 tons; Norway, 43 tons; Austria, 353 tons; Roumania, 26 tons; Russia, 570 tons; Finland, 46 tons; Sweden, 125 tons; Switzerland, 106 tons; Spain, 249 tons; British South Africa, 14 tons; China, 20 tons; Japan, 91 tons; Argentine, 279 tons; Brazil, 34 tons; Chili, 47 tons; United States, 17 tons; Australia, 21 tons.

Primary Batteries and Parts.

Total weight, 1,807 tons. Value, $750,000. The chief countries exported to: France, 88 tons; Great Britain, 485 tons; Italy, 43 tons; Holland, 146 tons; Russia, 85 tons; Sweden, 252 tons; Switzerland, 135 tons.

Electrical Heating and Cooking Apparatus and Parts.

Total weight, 330 tons. Value $406,000. The chief countries exported to: Austria, 42 tons; Russia, 53 tons; Argentine, 30 tons; Brazil, 18 tons.

Asbestos, Mica, and Micanite Insulators.

Total weight, 260 tons. Value, $274,000. The chief countries exported to: France, 53 tons; Great Britain, 45 tons; Austria, 33 tons.

BRITISH ELECTRICAL TRADE: WAR EFFECT.

By Albert H. Bridge.

The British Government has appealed to British manufacturers to do their utmost to maintain their productive plants at their maximum operative capacity in the hope of preventing unemployment in critical times. It also urged the British Colonies to not only continue but, where possible, to extend trade with England for the same purpose. Electrical firms were among the most willing to meet the Government request but they were hindered during the days of early financial tension by a tendency on the part of purchasers and these, some of them believed to be public authorities and big buyers), to take advantage of clauses in their contracts to suspend and delay work on account of the war. Members of the British Electrical and Allied Manufacturers' Association who employ tens of thousands of workmen were soon so affected in respect of contracts representing over five million dollars. The Association proceeded to give widespread publicity to an appeal asking prompt and sympathetic consideration of the matter at the hands of all present and prospective purchasers of electrical goods and goods used in connection with electrical work. It pointed out that it was a primary duty of every Britisher to maintain employment wherever possible at such a crisis in England's history and remarked that should contract suspension or delay become at all the common practice, the result for working men would be disastrous. It is anticipated that many industrial works and electrical concerns which have ordered equipments in Germany will be placing fresh contracts in substitution of these either in England or neutral countries.

Searchlight Carbons.

There should be a good market for carbons in England just now—especially for searchlight and arc-lamp purposes. Only to a very limited extent are these manufactured in the United Kingdom, large supplies being constantly obtained from Continental countries now engaged in the war and therefore not supplying.

One Thousand Electricals Ready.

In response to its circulars the English Institution of Electrical Engineers received offers from 1,000 members and non-members of practical electrical training and experience, who were prepared to place themselves either at the service of the Government in connection with the war or for disposal in maintaining public electrical undertakings—lighting, power and traction—which were more or less seriously handicapped by the calling up of part of their staffs for active service. The Institution has classified these men with sufficient details of their occupation to enable a suitable selection for particular service to be made as required.

Germany's Electrical Sales to Her Foes.

During the first half of this year German electrical works sent greatly increased supplies of dynamo-electric machinery and appliances into Russia. The advance for such machines as dynamos, motors and transformers weighing from 25 kilograms to 500 kilograms was more than 60 per cent in weight as compared with the first half of 1913. Metal-filament lamps and appliances for light and power were also sent in in far larger volume. The possibilities for electrical business in the Russian Empire are recognized as most promising. Exports of German cable to Belgium and Holland increased at an almost phenomenal rate during the same half year. To Japan there was a considerable falling off both in electrical machinery and accumulators, and a big slump in electric cable, but there were increases in metal-filament lamps and light and power appliances. It is considered that, whatever the issue of the war, sentiment will not incline these countries to buy any more German electrical goods than they are absolutely compelled for many years to come. The demands of France also fell away, the chief activity being in electrical machinery, metal-filament lamps and telephones.

New Canadian Niagara Water-Power-Project.

The Ontario Hydro-Electric Commission proposes to establish an electric generating plant at Queenston, Ont., to utilize the waste waters of the new Welland ship canal and 6,000 cubic feet per second of Niagara River water not allotted by the Canadian authorities. A short time ago it was announced the Commission would build a power plant at the Niagara whirlpool. Recently it was announced that the whirlpool site had been abandoned in favor of Queenston, because a greater fall could be obtained there.

The proposed power plant will be built below Queenston Heights. It will be capable of generating about 250,000 electrical horsepower. The power house will be of the most modern type and high-efficiency machinery will be installed. It is said it will be the best equipped power station in the world.

Surveyors have begun staking out the route of the canal that will carry the waste waters from the Welland canal and water from the Niagara River at Chippewa to Queenston to operate the power plant. The canal will be tapped at Port Robinson.

Electrical Engineering Problems.

By R. G. Hudson and W. V. Lyon.

In a series of problems, of which two will be given each week, it is proposed to state and illustrate the fundamental principles of electrical engineering. The problems will be selected as far as possible to show the application of such principles to practical electric circuits. The subject will be developed gradually from the simple to the more complex cases and along parallel lines, one problem each week illustrating direct-current and the other alternating-current principles. The problems will be given one week before the solutions so that the reader may by working the problems test his own knowledge of the subject, and in the solutions which follow he may check his results or study the explanation of some obscure point.

In order that the series may run smoothly without interruption, the authors must presume that the reader has some general knowledge of the subject and has a fair understanding of the mathematics involved. It is suggested, if the reader has any difficulty in understanding any of the principles involved, that he read a less contracted explanation in any standard textbook. It is also beyond the scope of this series to give a detailed description of the parts of electrical machines, etc., and if the reader is in doubt, for example, as to what is meant by an "armature" he should read a description of it in some textbook.

The various symbols and electrical terms used will be explained as the subject is developed. Each principle which permits of expression as a formula will be designated by a number in brackets, thus [6], and in each solution the principle number will be placed at the left of the mathematical work so that the reader may refer back to the principle involved in that particular calculation.

DIRECT CURRENTS.

Problem 1. A three-cell storage battery is charged by a generator as shown in Fig. 1. Given the following data: Electromotive force of generator, 7.4 volts; electromotive force of each cell of battery, 2.2 volts; resistance of generator armature, 0.04 ohm; resistance of each connecting wire, 0.05 ohm; resistance of each cell, 0.02 ohm.

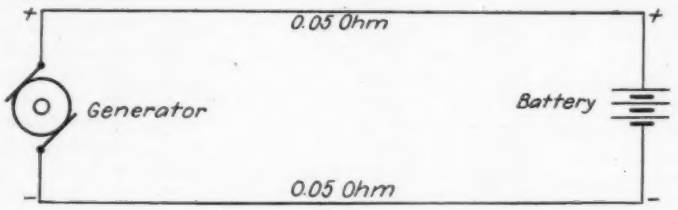


Fig. 1.

Find (*a*) resultant electromotive force in the circuit; (*b*) total resistance of the circuit; (*c*) charging current of battery; (*d*) terminal voltage of generator; (*e*) terminal voltage of battery; (*f*) total potential drop in connecting wires.

This problem is given to illustrate the principles involved in a series circuit.

ALTERNATING CURRENTS.

Problem 51. A single-phase alternating-current generator supplies power to a load requiring 48 kilowatts at 232 volts. The current is 254 amperes. (*a*) Draw both curves and vectors, representing the current and voltage; (*b*) What is the angle of phase displacement between the voltage and the current; (*c*) What is the power-factor of the load; (*d*) What is the equivalent impedance of the load; (*e*) What is the equivalent resistance of the load; (*f*) What is the equivalent reactance of the load?

This problem illustrates the determination of the resistance, reactance and impedance of an alternating-current circuit.

Solutions of the above problems and two new problems will be printed in the next issue.

Commercial Practice
Management, Rates, New Business

Electric Signs and the National Advertiser.

The development of advertising on a large scale for products which are nationally distributed has been one of the most interesting features of modern business. Trade names are thus made "household words" in a few months or years, when the methods that were formerly used would have required a generation to accomplish the same results.

One of the biggest features in every modern campaign by a national advertiser nowadays is the electric sign. Painted bulletins, lighted at night, and signs that operated entirely by electricity are familiar to all, the advertiser using those of the latter type in prominent cities and on populous thoroughfares. Thus the "great white way" in New York and elsewhere owes much of its distinctiveness to the really remarkable displays by electric sign advertisers, who in a place of that kind are getting what amounts to national advertising.

But while the national advertiser has been mindful of the value of the electric sign, and has used it in many places, he has failed thus far to "hook it up" with the local dealer. The latter, it is now conceded, is the biggest factor in the situation, and unless he is won over to the idea of stocking up with the manufacturer's products, the campaign will be a failure. On the other hand, once his co-operation is secured, progress is certain, and if a fair demand is created by the advertising, the permanent success of the advertiser's business is almost assured.

In order to make it easier to get and keep the co-operation of the dealer, leading manufacturers of advertised goods have been paying a lot of attention to linking up their campaigns with the stores of the retailers handling their goods. In other words, the shoe dealer handling the "Bulldog" brand doesn't always see that it is an advantage for this brand to be advertised in the national magazines; but when it is shown that by displaying the hangers, store signs, and other matter of this kind, and by using the newspaper electros and moving picture slides which are furnished him, he can bring the attention of his own customers to the fact that he is carrying the famous "Bulldog" brand of shoes, he immediately takes another look at the proposition.

And, it is true, manufacturers have realized that advertising in general, without advertising in particular—in other words, telling the public what without telling it where—involves a large waste of money. The customer may be interested in an article he has seen advertised, but if the local merchants fail to call his attention to it, and if the stores which he regards as leaders in his community fail to stock it, the advertising in that particular community is a dead loss to the manufacturer. And the same is true if the stores where the goods are on sale are not indicated in someway.

It is not often possible to list the names of retail distributors in general advertising, and it is even difficult to localize the newspaper advertising, especially if the product is sold to the retailers through jobbers. Hence the methods referred to above, which are used to bring the store where the goods are sold to the attention of the public, and thus cash in on the general advertising, are bound to be effective, to reduce waste and to make the sale of advertised goods easier for the dealer. Here is where the electric sign comes in.

The manufacturers who have been using the sign have classified it as "general advertising" for the most part and have put a good deal of money into erecting signs in the big towns where they would do the most good, and would reach the most ultimate consumers. Now, however, they are waking up to the fact that when it comes to pointing out the stores where their goods are handled, the electric sign is superior to any other kind of advertising, and can be put at the head of the list of "dealer helps," to which so much attention has been given.

It is obvious that the shoe dealer referred to above may make some impression by distributing circulars, putting in window displays and using moving picture slides which speak of "Bulldog" shoes and John Smith, shoe dealer; but how would they compare with an electric sign over his door, with "Bulldog" and "Smith" equally prominent? As a matter of fact, such a sign couldn't be beat, either for publicity purposes or for the more immediate task of getting the consumer to see that Smith handles "Bulldog" products.

In most cases the manufacturer supplies the dealer with all the helps his advertising department has developed without hindrance, because the individual items are not especially expensive, though the total is a pretty high. But in most cases there are no restrictions, and the dealer with a small stock and one with a big one are treated alike. In the case of the electric sign, with a considerable initial expense, this could be made a real selling argument, for the dealer, appreciating the extent of the investment that would be involved, would be more inclined to meet the requirements of the manufacturer in the matter of stocking up.

The conditions under which the sign might be erected to the advantage of the manufacturer as well as the dealer are these: (1) Erection at the expense of the manufacturer; (2) maintenance at the expense of the retailer; (3) agreement on the part of the retailer to carry the goods in stock, and to maintain a sufficient stock to take care of a reasonable demand.

The manufacturer who went to the dealer with a proposition of this kind would be pretty sure to get a respectful hearing, because every retailer appreciates the advantage of having a sign in front of his store. And he could get suitable signs, made up in quantity, at a price that, considering the business he could add through the medium, would be reasonably low. By furnishing his dealers with signs of a uniform appearance, he would get another benefit, in that the public would learn to recognize these emblems, and would accordingly be impressed by them. In some cases where retailers voluntarily erect signs to feature the name of some trade-marked product handled by them, there is a wide difference in the design of the signs, and this lack of unity and coherence would be eliminated were the manufacturer to attend to the design and the erection of the displays.

Signs could be adapted to every kind of product handled through retail stores, from shoes, pianos and clothing and food products and automobiles. Every national advertiser would be able to see the advantage of getting his leading distributors to make use of the signs, both because of the

increased sales which the retailers could make, and because of the lead to greater volume which would be furnished to the retailers.

Some instances of how the plan would work have already been given. In Louisville, Ky., which is about the leading whisky market in the country, the Federal Sign System (Electric) has "signed up" two distillers who are using the plan in connection with their retail trade. These are the Bernheim Distilling Company and C. P. Moorman & Company. The latter concern is having signs erected with the central disk uniform and the top and bottom panels varying according to the desires of the dealers. All told, erected in front of a saloon inside which the concern's particular brand is dispensed, the cost to the distiller is about $75 for each sign. Three signs have already been put up, all of them as it happens, in Jacksonville, Fla.

The possibilities of winning the national advertiser over to a plan of this kind, as a localized and intensive form of publicity, in connection with the general publicity secured from the big signs put up in the larger cities and at the main intersections, appear to be brilliant. The dealer sign is a logical proposition, and one that the astute manufacturer, it seems, will not be slow to grasp.

Unusual Power Development in Wichita.

The growing value of reliable central-station service for high load-factor business is strongly exemplified in Wichita, Kans.

The Kansas Gas & Electric Company during the past six months closed contracts with the following flour mills, which were formerly operated with steam equipment, natural gas at 12:5 cents per thousand cubic feet being used under the boilers.

	Horsepower
Imboden Milling Company.....	250
Howard Mill.....	265
Red Star Milling Company.....	250
Wichita Flour Mill.....	420
Empire Mill	300

During the past few weeks, these mills have all been in very active operation on account of heavy shipments of flour which will probably be demanded by European customers, and they are running steadily at full capacity twenty-four hours a day, turning out an average of 5,700 barrels of flour daily.

Results have exceeded both the expectations of the central-station company and the millers.

As an instance of this, the Red Star Mill is preparing to install additional motors, aggregating 100 horsepower, in the same mill for operating elevators and storage bins, which were formerly operated by a natural-gas engine. This will be removed and motors installed in place of same.

This milling company is also drawing plans for installing electric drive, totaling 500 horsepower, for another mill which will also be located in Wichita. This will probably be equipped within the next six months.

The Otto Weiss Alfalfa Company installed a 200-horsepower motor drive on trial in place of a gas engine. Production has been increased to such an extent, due to reliability and steadiness of service, that the gas engine would not now be able to handle the same load.

In addition, a power contract has recently been closed with the branch plant of the Cudahy Packing Company, which will give them a connected load of 400 horsepower. This company formerly operated its plant with direct-current motors and its own generating equipment, but are now purchasing an entire new equipment of alternating-current motors to be installed in the near future.

Walsenburg Electric Show.

As if under the auspices of the United States Government, The Trinidad (Colo.) Electric Transmission, Railway & Gas Company recently conducted an electric show at Walsenburg, Colo. The Federal troops are encamped in the city to preserve order during the coal strike, yet despite the fact that the city is under martial law, and that it has been battered by shot and shell from miner, mine guard, and troops alike, an electric carnival was held there recently which was a huge success in every way.

Walsenburg, in times of peace, has a population of less than 2,500 persons. It is located 50 miles north of Trinidad, Colo., and an equal distance south of Pueblo.

General Manager Franklin P. Wood, of the electric company, decided that despite handicaps, he would conduct an electric carnival, feeling that such an affair would be just the thing to "liven" up the city, and help bring it back to its natural state. The affair was an even bigger success than anticipated. While the show was being held, cavalry patrolled the zone, which though quiet was nevertheless under the watchful eye of Uncle Sam. It is not thought there will be any more trouble, as the strike has been to a great extent broken.

The strike and matters before the strike had engendered some antagonistic feeling among the business men toward one another, the city had in fact been split into factions. Though the show was given primarily to "liven" things up, it worked out so that a closer spirit of co-operation between the business men was brought about. It broadened the public policy of the electric company. It was the means of demonstrating the utility of electrical appliances, and it resulted in the sale of a large number of devices.

A business men's luncheon on the first day of the three-day carnival, which was held in the Walsenburg Opera House, resulted in the attendance of all factions, who broke bread together and buried the hatchet. Plans for a Commercial Club were formed and now apparently all is serene with the business interests.

The show was under the management of Franklin P. Wood, general manager, Trinidad Electric Transmission, Railway & Gas Company, who was assisted by W. P. Wooldridge, H. H. Hoyt, S. J. Ballinger, H. J. Reed and W. R. Shade, the latter being local manager at Walsenburg.

All food for the luncheons, teas, etc., was cooked electrically. The business men's luncheon resulted in the sale of two electric ranges, cash on the spot, several smaller devices, three electric signs and plans were drawn for better store lighting in two stores.

The second day of the show there was no feature, beyond caring for the crowds that came to witness the demonstrations. The third day was the banner attraction. An afternoon tea for ladies was served to nearly 500 persons. Many were unable to get in. Over 100 electrical devices were sold at this affair.

Each evening free "movies" were shown at the theater. The films were furnished through the courtesy of the General Electric and Westinghouse companies. Brief lectures on the advantages of using complete electric service were given. At every performance many were turned away, unable to get into the playhouse.

The newspapers devoted considerable space to comments regarding the show, which with the half-page advertisements gave splendid publicity to the affair and was largely accountable for the success of the show.

Minneapolis Plant Placed in Operation.

The Minneapolis General Electric Company announces that the second unit of 2,100 horsepower in the Coon Rapids hydroelectric plant has been placed in commission and has been delivering power since August 22. Other units are being installed as rapidly as possible, and it is expected to have all five in operation by November 1. The units now in operation are working at approximately 95-per-cent load-factor. The company for the week ended August 14 reported 288 new contracts secured.

Electric Sign Data

The Sketch Evil.

Much publicity has been given recently to the evil of appropriating the sketch of one manufacturer and submitting it to another for building. A prize contest was recently conducted by Signs of the Times to obtain suggestions for the relieving of this situation and the following is one of the prize-winning contributions, submitted by Norman B. Hickox of the Greenwood Advertising Company:

The writer has been very much interested in the various articles appearing in the electrical trade journals lately regarding the evils and abuses practiced in the manufacture and sale of electric signs. My ideas for a successful and permanent abatement of these nuisances, for nuisances they are, are as follows:

(1) Let every sign manufacturer plainly mark his designs as his own property, and let the policy of every sign manufacturer be firmly fixed along the line of accepting no ideas, making no prices, or building no signs from competitors' sketches.

(2) Let the manufacturer make sure that his policies are impressed on his sales force in such a way that they can diplomatically educate their central-station customers, besides the individual purchaser, that their policy is such and that they will brook no peddling of their designs and prices. Much good can be done by the sign salesman, who comes into personal relationship with the various central stations and their buyers.

(3) That a bureau be established in charge of a disinterested and wholly neutral party, such bureau to be maintained by reputable sign manufacturers who desire to subscribe to the service to be obtained from same, which will keep a record of all salesmen, report promptly to the individual manufacturers when their designs are being misused, establish friendly relations with all central-station buyers, especially the larger ones, for the purpose of securing information for the betterment of the business, and endeavor constantly to promote the use of electrical advertising by educating and assisting the central station buyers. This bureau could also make a collection of various sign ordinances, and assist in the enactment of proper ordinances where necessary.

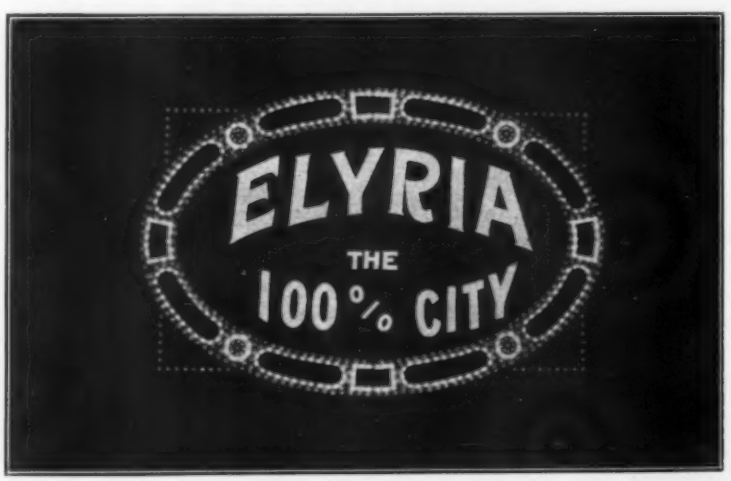
If found advisable, it can also establish standards of construction in a general way, but along lines which would not be harmful to any manufacturer or group of manufacturers.

This bureau also to be used as a clearing house through which manufacturers could exchange ideas as to their policies and necessary changes in same which are required from time to time, and also for any information for the betterment of the industry which any particular subscribing manufacturer might care to give out.

It could also act as a medium for the dispensing of royalty contracts covering patents held by individual manufacturers, and serve the industry in a very efficient and capable manner if properly conducted.

The sign suggestion presented on this page is another city slogan and adds to the rapidly growing list. Elyria is a city of 20,000 population, a live, busy town with considerable industrial wealth and fame. The local central station operates under the name of R. E. Burger, agent, Electric Light and Power, and is one of the Doherty properties. H. G. Bonner is manager of the new-business department. Recently this company presented to the city a big slogan reading, "Elyria—The 100% City," the slogan that had been adopted as the result of a popular competition. The design of the sign is most effective, as seen in the picture, but its beauty rests primarily in the blending of a large variety of colors. It is erected in a particularly favorable position where it dominates the main business street of the city, the Public Square, and is read from every passing train on the Lake Shore Railroad.

Fully one-third of the population of Elyria turned out on the night of presentation, to see the big sign lighted up and hear the speeches. The sign was presented to the city in a speech by George Williams of Henry L. Doherty & Company, and accepted by the mayor of Elyria. Other speeches were made by the president of the local Chamber of Commerce and several others.



Slogan signs presented to the city of Elyria, O., by Henry L. Doherty & Company. Sign is located along Lake Shore tracks.

Sign measures 36 feet by 50 feet and is surrounded by a richly jeweled border in Bulgarian colors. It is wired for scintillating effect.

Five colors are used in the effect: Opal, red, green, amber and white.

Sign was manufactured by the Valentine Electric Sign Company, Atlantic City, N. J.

Electrical Construction

TERMINATING AND LIGHTNING-PROTECTION ARRANGEMENTS FOR A HEAVY CONDUCTOR RUN.

By Arthur O'Brien.

It is the purpose of this article to describe the methods that were used in one of the industrial plants of a large corporation in terminating an aerial run of 300,000 circular-mil stranded weather-proof conductors at their entrance to a steel mill building.

Fig. 1 shows a front and a side elevation of the building at the point of entrance. The 300,000 circular-mil conductors were carried from a pole, shown in Fig. 1, to the terminal fixture that was attached to the building, as shown in plan Fig. 5 and in section in Fig. 4. The conductors, of which there were two for a 250-volt, direct-current circuit for motor service, were insulated from the structural-steel terminal fixture with a strain insulator as suggested in Figs. 5 and 4. From the exterior of the building, as shown in Fig. 4, the conductors were carried inside and into a conduit line for distribution throughout the structure.

The lightning arresters were mounted on the inside of the end wall of the monitor, as detailed in Fig. 7. The ground wire for the arresters was carried inside of the building, as shown in Fig. 7 to a point below the location of the fixture and then through and down the outside wall to a buried copper ground plate, as detailed in Fig. 1.

It is the practice of the corporation that made the installation to use non-combustible materials whenever possible for its electrical installations. Although this practice involves high first cost, it minimizes fire risk, and insures permanency, which means low annual cost, the item which should be

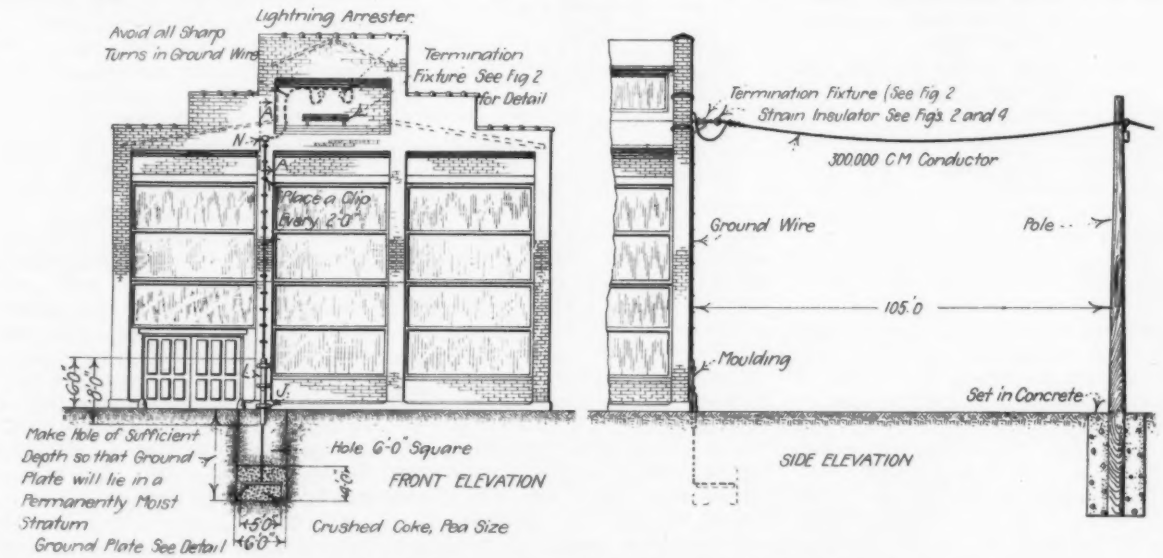

Lightning Arrester
Avoid all Sharp Turns in Ground Wire
Termination Fixture See Fig 2 for Detail
Place a Clip Every 2'0"
Make Hole of Sufficient Depth so that Ground Plate will lie in a Permanently Moist Stratum
Ground Plate See Detail
Hole 6'0" Square
FRONT ELEVATION
Crushed Coke, Pea Size
Termination Fixture (See Fig 2
Strain Insulator See Figs. 2 and 4
300,000 C.M. Conductor
Ground Wire
Pole
105'0
Moulding
Set in Concrete
SIDE ELEVATION

Fig. 1.—Arrangement of Ground Wire and Method of Making Ground.

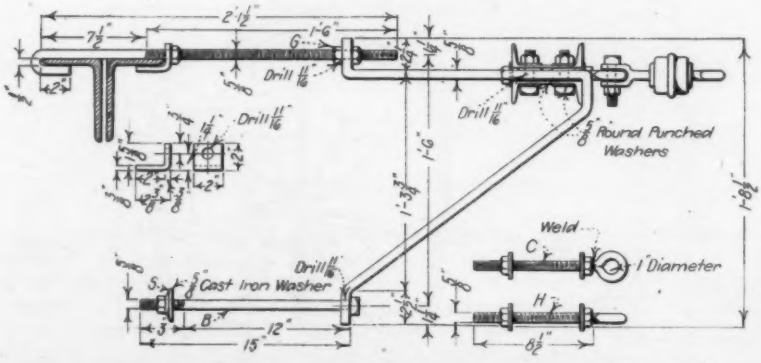


Fig. 2.—End Elevation of Terminal Fixture and Detail of Eye-Bolt.

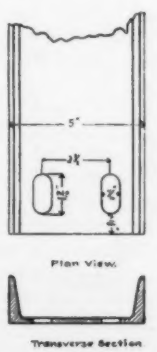


Fig. 3.—Detail of Slots in Steel Channels.

considered after all rather than first cost.

Following this procedure, the termination fixture attached to the end of the building, as shown in Fig. 1, was constructed wholly of structural-steel and wrought-iron sections. The beam or arm of this fixture which assumed the weight of the conductors was built of two eight-inch channels, as shown in Figs. 5 and 2. The channels were bolted to and supported by brackets forged from 2-by-5/8-inch wrought-iron bar. To hold each bracket, a hook bolt and a machine-bolt were utilized. The hook-bolts used at the top of the bracket were made of sufficient length to pass entirely through one of the brick panels in the wall and to engage on two angles comprising the upper chord of the roof truss of the building. It was necessary to thread these hook-bolts for almost their entire length, as shown in Fig. 2, so that the nuts, used to clamp the small L-shaped piece, *F*, in Fig. 2 against the angles, could be turned into position. The lower support *B* was an ordinary machine bolt. A cast-iron building washer *S* was run on its end to prevent the nut from digging into the brick wall.

To support the strain insulators upon which the 300,000-circular-mil conductors were terminated, two eye-bolts, as shown in Fig. 2, were used. Punched washers *H* were run onto these bolts to prevent the corners of the nuts from catching in the slot between the two channels when the nuts were turned. Fig. 4 shows an assembly of the whole arrangement.

In installing the termination fixture, a hole for each one of the bolts was drilled through the brick wall, then the L-shaped piece *F* and the nut adjacent to it were run on the hook-bolt, which was then pushed from the inside of the building through the wall until the hook on its end fitted over the flange

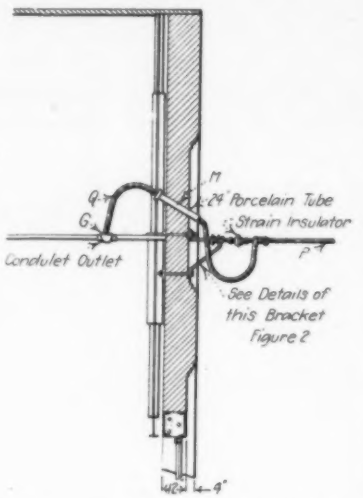


Fig. 4.—Section Elevation Through FF in Fig. 7.

of the angle iron. The nut adjacent to the L-shaped piece was tightened until the hook-bolt clamped tightly the angles composing the roof chord. A nut *G* (Fig. 2) was turned on each of the hook-bolts to provide a firm backing for the projection of the wrought-iron bracket that rested against it, and to provide a means whereby the bracket could be correctly alined. The other nut, the one on the outer end of the hook-bolt, prevented the bracket from being drawn away from the building. The lower bolt *B* was pushed in from the outside.

Wrought-iron stock of five-eighth inch diameter was used for the eye-bolt *C*. So that there would be ample clearance for these bolts in the slot between the two channels, wrought-iron washers were inserted between the bracket forgings and the channels, increasing the width of the slot to about three-fourths inch. Each eye-bolt was threaded for its entire length to provide a means whereby the conductors could be tightened. The holes for the bolts that clamped the channels to the brackets were made of an oblong shape, as detailed in Fig. 3, so that it would be certain that the brackets could be attached to the channels even if the holes through the brick wall for the hook bolts and the through bolts were inaccurately located.

Giant-strain insulators, each having an eye at one end and a clevis at the other, were used to insulate the conductors from the terminal structure. The clevis of each insulator fitted over the hole-end of an eye-bolt and was held there with a five-eighth-inch machine-bolt. The 300,000 circular mil, weatherproof conductors, *P* in Fig. 4 were dead-ended in the strain insulators. The double-braided, rubber-covered conductors Q were brought out of the conduit through a condulet *G* and then through a 125-inch internal-diameter porcelain tube *M* which was cemented in the wall to the outside of the building, and soldered to the weatherproof-insulated conductors. To prevent the entrance of moisture the tube was inserted in the wall at an angle of 30 degrees with the vertical and was firmly held in place with Portland-cement grout. A drip-loop was formed in the conductor, also.

For lightning protection, a multi-path carborundum-type arrester, good for a maximum voltage of 600 volts

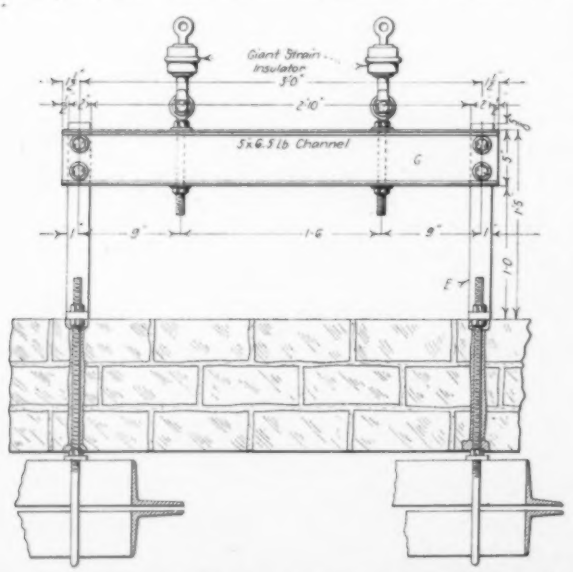


Fig. 5.—Plan View of Termination Fixture for 300,000-Circular-Mil Conductors.

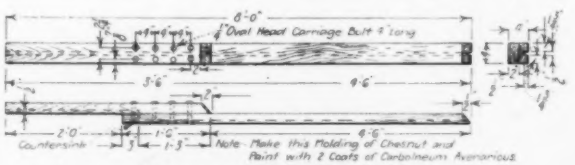


Fig. 6.—Wooden Molding Details.

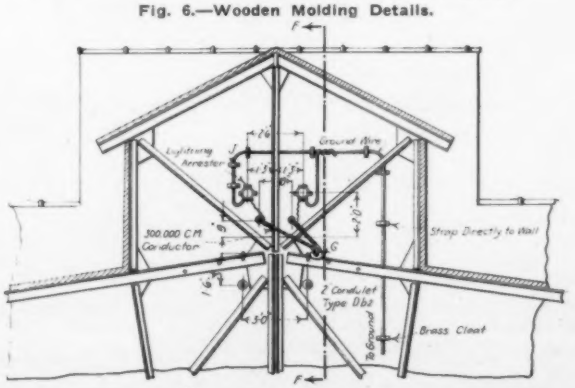


Fig. 7.—Arrangement of Wiring and Fixture Supports Inside of Monitor.

direct current, was connected to each leg of the circuit, as shown in Fig. 7. No. 4 weatherproof insulated stranded ground wire, held to the interior wall of the monitor with small brass cleats of the type obtainable at any electrical supply house, connected the dead side of the arrester with the ground. The ground wire was cleated directly to the surface of the wall, each cleat being held in place with two round-head wood-screws turned into expansion anchors. At the point *N*, Fig. 1, the ground wire was carried through the brick wall as shown in Fig. 8. Two porcelain window-tubes cemented in the wall were used at this outlet. It probably would have been permissible to have carried the ground conductors through an unbushed hole at this point; but the application of the window-tubes provided a smooth raceway through which the conductor could be readily drawn, and they also insured against the entrance of moisture. Another reason why the tubes were used is that experience has shown that the pipers, machinery erectors, roofers, and other workmen around an industrial plant do not have much respect for a wire that is not supported on porcelain passing through an unbushed hole in a wall. If the wire interferes with their work, they may cut it. However, if the wire is supported on porcelain and looks as if it were carrying electric current, the workmen will not disturb it.

Down the outside of the building to a point six feet above the ground line, the ground wire was supported to the wall with brass cleats exactly like those used on the inside. For a distance of six feet above and two feet below the ground line, the wire was protected with wooden molding *L*, as shown in Fig. 1 specially made in the company's carpenter shop, as detailed in Fig 6. This molding was held to the wall with a strap *J*, shown in Fig. 1 detailed in Fig. 10. Chestnut was used for the molding, and it was given two coats of a wood preservative. The application of this material on chestnut, which lasts longer, when set in the ground, than any of the common woods, insured a maximum life for this member of the installation. It was the only member for which wood was used. A metal tube or molding was not used for the protection of the ground wire because if the wire had been incased in a metal jacket the inductance would be increased, which would impair its effectiveness as a pathway for static discharges. The top of the molding was beveled so that it would shed moisture and dirt. An offset was necessary two feet from the bottom of the molding to clear the top of the concrete foundation of the building which extended beyond the surface of the rest of the wall. The cleats *J* were fastened to the brick wall with lag screws turned into expansion anchors.

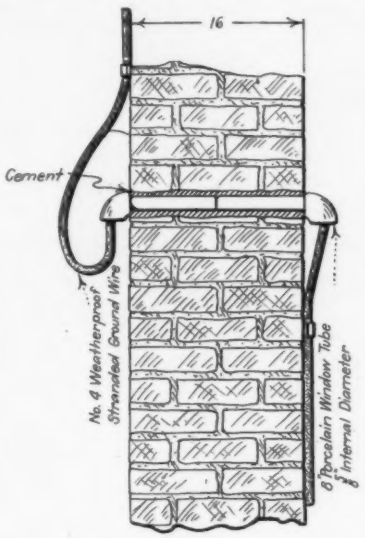


Fig. 8.—Method of Carrying Ground Wire Through Wall. This Shows Section at AA, Fig. 1.

A copper plate and coke ground connection was installed as suggested in Fig. 1. It was necessary to dig the hole, which was six feet square, to a depth of 10 feet to reach a permanently moist stratum. The hole was filled to a depth of two feet with pea-size crushed coke. The ground plate detailed in Fig. 9 was then laid in and another layer of coke tamped over its top. Slots one inch long were cut in the plate and the ground wire was woven through these as shown, which afforded a good mechanical connection. Then the wire was thoroughly soldered to the plate.

In addition to the plate ground, auxiliary grounds not shown in the drawings were made on the water and steam-pipe systems within the building and a ground wire was also run to the steel frame of the structure. All of these auxiliary grounds were ultimately connected with the ground wire going to the copper plate.

The installation has thus far given excellent service and there is every reason to believe that it will be continued for an extended period.

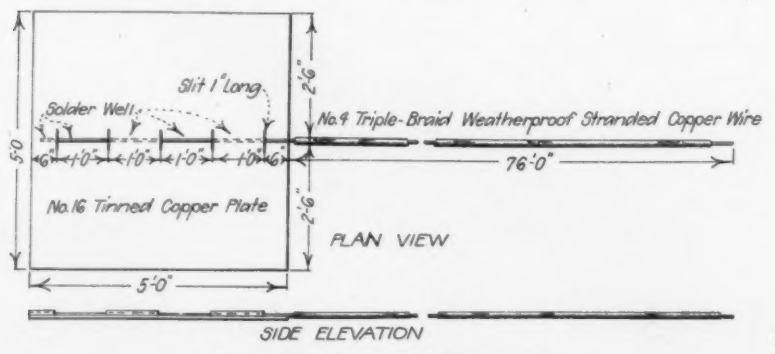


Fig. 9.—Details of Copper Ground Plate.

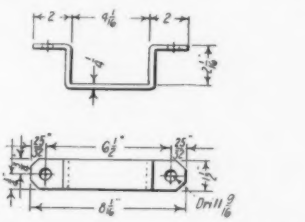


Fig. 10.—Detail of Strap for Holding Molding.

Among the Contractors.

The Wolfe Electric Company, of New Brighton and Beaver Falls, Pa., has been awarded the contract for the electrical wiring to be done on the Pinney Street school at Rochester, Pa.

The Marine Electric Company has been awarded the contract for the electrical installation in the addition to the large fireproof storage warehouse in Louisville, Ky., for which the National Concrete Construction Company has the contract.

The Vedder Electric Company, Cleveland, O., has secured a contract for wiring, motor installation and furnishing fixtures for the bottling works of the Diebolt Brewing Company in that city.

The Empire Electric Company, electrical supply dealers and contractors, opened offices at 305 Minor Building, Kansas City, Mo., about the first of September. The company is equipped to do all kinds of electrical construction work, including municipal work. J. M. Reacy, manager of the new concern, was formerly manager of the National Electrical Construction Company at Kansas City.

National Association of Electrical Inspectors.

THOMAS HENRY DAY, President, 59 Deerfield Avenue, Hartford, Conn.
H. S. WYNKOOP, Vice-President, Municipal Building, New York, N. Y.
WILLIAM LINCOLN SMITH, Secretary and Treasurer, Concord, Mass.
JAMES E. COLE, Representative on Electrical Committee of National Fire Protection Association, City Hall Annex, Boston, Mass.

Executive Committee
EUGENE N. DAVIS, Chairman, Brookline, Mass.

SECTION REPRESENTATIVES:
C. H. Fletcher, H. Burnes, British Columbia.
A. W. Hopkins, G. W. Perry, Western New England.
Washington Devereux, A. H. Lilley, Philadelphia.
E. N. Davis, H. A. Knight, Eastern Massachusetts.
C. A. Hannan, O. E. Smith, New York City.
C. W. Mitchell, John W. Carrell, California.

MEMBERS AT LARGE:
George L. Collison, James B. McCarthy, Frank R. Daniel, Thomas D. MacColl, James H. Fenton, A. A. Moffitt, F. G. Hartwell, R. P. Strong, J. E. Latta

"LET THE CODE DECIDE."

Secretary's Message.

It will be remembered by our members that in the reply by "P" to question No. 267 printed in the issue of the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN for July 18 there was a sentence italicized which members were asked to treat as a separate question and forward information regarding it to the Secretary. The original question referred to the possibility of using "plumbers' fittings" in cases where short offsets, 45 per cent bends, etc., were desired in conduit work in steel-concrete buildings, and the sub-question to whether there was not an actual need for a fitting of a different type than now constructed for electrical use.

I have received a reply from Executive Committeeman Devereux in which he states: "Occasions have arisen where we have permitted the use of these fittings when they have been specially treated with a galvanizing sherardizing or enameling, and all burrs and fins removed. The cases, however, were very rare and no ill result arose from their use."

President Day has also written me a letter in which he makes use of the following language:

Under the symbol letter "P" in the July 18 issue appeared the following "We would like to know how this condition is being met in other territories, and is there developing a need for a conduit bend that requires less space than the one which is now standard?" The above question relates to the use of steam fitters' elbows on conduit systems. In the earlier part of the same question, which in fact was an answer to Question No. 267, the writer very properly stated that "steam fittings cannot be classed as conduit fittings," and then, very clearly, stated why. In our reinforced-concrete buildings there is at least one place where I have found that the standard conduit fitting did not solve the installation problem. We will assume that the floor has been divided into "bays" like a mill-constructed building. These "bays" are between steel beams, the beams being supported on steel columns. The floor is of reinforced concrete, in which the conduits have been buried. The steel beams, which are covered with concrete, on expanded metal, extend eight or twelve inches below the concrete, in the "bays," which forms the ceiling. The

Use of Elbows with Mill Construction.

outlets are located in the centers of the beams and the specifications require that none of the conduit be seen. The concrete over the face of the steel beams is, in fact, only a skimming seldom over an inch in thickness, sometimes less. Here is a condition where the standard conduit fitting will not solve the problem. The standard beam is, in fact, only a skimming of conduit down on the side of the beam, but there is not sufficient room from the side of the beam to the outlet box, which is on the face of the beam. In this condition we have permitted the use of a galvanized, ninety-degree elbow, with the full knowledge that it was contrary to the rule, but because we knew of no other way to suggest. The problem would be somewhat simpler if the specifications permitted a fitting to show on both sides of the beam. I am glad Question No. 267 was asked, as it brought out a more direct query from "P", whose question I have endeavored to answer by a condition which has freqnently confronted me.

These are all the comments which have been received to date, but the Secretary has thought it best to print them now, before the original question had receded too far into the background, rather than wait for possible additional replies. He regrets that personally he can add nothing in the way of information as his experience with installations involving reinforced concrete construction is too limited.

The matter appearing in this section consists of questions on the National Electrical Code, its interpretation and meaning, and questions as to whether certain methods of wiring are in accord therewith. These questions are gladly received from anyone interested, even if not a member; they should be sent to the secretary with any needed elucidating sketch. They are answered by each member of the Executive Committee according to his knowledge of what the ruling would be in his jurisdiction.

It should be understood that no pretense is made to give an authoritative interpretation of the Code. This is a voluntary association; it has representation on the Electrical Committee of the National Fire Protection Association, which prepares the Code, but it has no right, and claims no right, to give a final interpretation of anything in the Code. It is only intended to give the interpretation which seems correct to the members of the Executive Committee. No attempt is made to edit or correlate the answers from the different members of the Committee, as it is felt that the occasional difference of opinion is calculated to lead to a further study of the matter in question, further discussion and the final clearing up of obscure points.

The aim is to help toward a better understanding of the Code on the part of all; a more uniform conception of its meaning; increased precision in applying it; and harmonious action of those using it, for the common good.

Installation for High Temperature.

Question 272. In a steam bakery oven it is desired to run a conduit about six feet long inside the brick work where the temperature is to reach 400 degrees Fahrenheit. What kind of insulation should be used in this case?

Answer 1 (U). This seems to be a special case and requires special attention both in construction and inspection. The only standard insulation that could be used would be asbestos-covered wire.

Answer 2 (T). I should advise securing special permission from authorities in control to use approved slow-burning wire.

Answer 3 (B). Under these conditions the slow-burning insulation

would undoubtedly in my judgment give the best results. One objection, however, to slow-burning wire within conduits in hot locations is that at the exposed end of the conduit, if located where temperature drops to any extent below the location of the rest of the conduit, temperature changes cause condensation at times within conduit, with resulting injury to slow-burning insulation and ultimate breakdown.

Answer 4 (F). Slow-burning insulation commonly known as Underwriters' wire or the equivalent thereto in fire and heat-resisting qualities.

Answer 5 (S). I should recommend the use of slow-burning wire for this place. Rule 26*n* requires rubber insulation, but see Rule 52*a*.

Answer 6 (N). This is such a special case that I should forget insulating material on the wire entirely and use bare wire, the particular plan depending upon the arrangement of the oven; thickness of brickwork, etc. There are a number of ways in which it could be done satisfactorily. It might be wise to use an asbestos wrapping between the supports which I should make of lava, but merely as a precaution against contact with the conduit caused by an unexpected amount of expansion. I should prefer not to use the iron conduit but rather a simple duct in the brickwork. I do not think you could get a ground that would pass a milliampere, even if dampness got in when the oven was cooling down, because it would not extend far enough into the heated and dry brickwork.

Answer 7 (O). To withstand this temperature slow-burning wire would be necessary. For such a location as this it is customary to arrange the portion of the conduit exposed to the high temperature insulated from the conduit system proper and then treat it as a "fixture," as allowed by Rule 26*v*, second paragraph, no provision being made in the rules for use of slow-burning wire in a conduit system.

Answer 8 (H) An asbestos-covered wire, if possible, or at least slow-burning drawn in carefully and attached to rubber-covered wire in the junction box.

Answer 9 (E). We would suggest, in fact have suggested, the use of conductors having a slow-burning insulation, or preferably conductors having an asbestos insulation where there has been the element of excessive heat to contend with.

Answer 10 (P). I should say slow-burning wire in carefully dried out and sealed conduit.

Answer 11 (R). I think no insulation will withstand this temperature; conduit should be removed elsewhere.

Answer 12 (Y). Slow-burning wire should be used.

Answer 13 (V). Conduit should be insulated, ends plugged with pulp asbestos to stop air circulation which would cause condensation and short-circuits, and asbestos- covered wire used.

Answer 14 (A). I should advise a bare wire in a lava tube, or else baking the bare wire in porcelain as in resistance coils. No other insulation will last very long.

Ventilation of Motion-Picture Booth.

Question 273—What is considered proper ventilation under Rule 38u7? If a flue is required should it not be installed in a manner similar to smoke flues of furnaces; that is to say, with air spaces or other heat insulation between the flue and near woodwork?

Answer 1 (U). As this flue may be required to carry off burning gases it is necessary to have air space about it in order to secure proper protection.

Answer 2 (T). I do not think Rule 38*u*7 asks for the elaborate details mentioned.

Answer 3 (B). What constitutes proper ventilation under this rule is of course a matter of judgment, and there would appear to be no hard and fast rule. In this commonwealth, however, proper ventilation is defined as follows:

Ventilation—Booths to be provided with an inlet in each of the four sides, said inlets to be 15 inches long and 3 inches high, the lower side of the same not to be more than 3 inches above the floor level, said inlets to be covered on the inside by a wire net of not greater than one-eighth inch mesh, netting to be firmly secured to the asbestos board by means of iron strips and screws.

Near the center of the top of the booth shall be a circular opening of not less than 10 inches in diameter, the upper side of said opening to be provided with an iron flange, which flange is to be securely fastened to the tee irons supporting the roof. Securely fastened to this flange shall be a vent pipe of not less than 10 inches, diameter, said pipe leading outside the building, or to a special incombustible flue. In this vent pipe shall be placed a box containing a 12-inch electric fan, said box to be provided with a door of sufficient size to permit of the examination or removal of this fan, this door to be made tight and provided with proper fastenings. Box and vent pipes to be made of galvanized iron or other non-combustible material. Fan to be so connected that it can be controlled from within the booth.

Answer 4 (F). This flue is intended mainly for ventilation. There is no necessity whatever for treating it as smoke flues for furnaces or other heating apparatus. Should a film at any time take fire in a booth, it would not heat the carry-off pipe sufficiently to ignite the woodwork that may be in contact with it. To require a ventilating pipe of this character to be installed as smoke flues for furnaces or similar heating devices would be an unnecessary hardship and unwarranted.

Answer 5 (P). The Code does not say, but the best practice seems to require a vent to the outside air, having a cross-section of at least 50 square inches, and providing for a flow of about 30 cubic feet per minute.

Answer 6 (N). In Massachusetts this is one of the details of construction given by a statute into the control of the State District Police. The requirement promulgated by them is given above in Answer 3 (B). The Code itself is not specific in this rule, but certainly a protection of the flue surroundings is not unwise and in many cases such a small additional item as to be most excellent design.

Answer 7 (O). Proper ventilation of a motion-picture booth under this rule should provide for sufficient circulation of air to enable the operator to work comfortably inside with the doors closed as required. It would of course be desirable to separate a metal vent flue from combustible material, but the rule is not sufficiently specific for the inspector to make it a requirement, provided the flue is arranged to carry the smoke and products of combustion outside the walls of the building as required.

Answer 8 (H). A six to eight-inch pipe dependent upon the distance to the chimney, and the draft. I shouldn't say it was necessary to use an air space between the flue and surroundings; however, it would be good construction.

Answer 9 (E). When the ventilating duct is a short one and it passes through woodwork, it would be a wise precaution to have a space between the two. I have felt however that the ventilating duct was for the passage of gas in case a film was on fire rather than for the passage of actual flames. There is not the same possibility for fire from the ventilating duct from a moving-picture machine as from a

metal smoke pipe from a boiler or stove.

Answer 10 (R). A flue is not required as the immediate purpose of the rule is to provide means for smoke to escape to outer air rather than into the auditorium.

Answer 11 (Y). Here an air space would be required to insure against ignition.

Answer 12 (V). Flue should be installed so as to reduce to a minimum the chance of hot gases igniting the surrounding woodwork.

Answer 13 (A). This flue should be protected by a tin or iron collar where the pipe passes through the wood, the same as smokepipes are protected.

Answer 14 (S). I think that the flue should be protected similarly to smoke flues for furnaces.

Public Service Commissions

Conducted by William J. Norton

CALIFORNIA.

Inductive Interference. The Commission has made public the results of an exhaustive investigation on the subject of inductive interference in telephone circuits caused by high-voltage lines. The investigation was carried on by a committee of engineers selected from the larger public utility companies and engineers of the Commission's staff.

The Pasadena Consolidated Water Company made application to the California Commission for a ruling on the question whether the company might continue to make a charge for service connections and meters. The Commission holds that "it is as much the duty of a water company to install the service connection to the property line and the meter, at its own expense, as it is to build the wells, reservoirs, and mains. A contrary rule would compel the user to donate part of its system to the water company." The Commission also points out that, on receiving, by donation, the property of the Pasadena Park Improvement Company, the company metered the system at its own expense. It is held that the company's practice in the matter should be uniform, and that, since the company subsequently claims possession of the meters, it should pay for them in the first place.

INDIANA.

The First Annual Report, Indiana Public Service Commission, has been made public. It contains a complete résumé of the work of the Commission from May 1, 1913, to May 1, 1914. It is extensive in character and range, approximately a score of elaborate tables being included with a general summary of the Utility Law, the causes of its passage, its constitutionality, its history in the 1913 Legislature and its results to date. The report contains a table of comparisons between the rates charged for utility service in the various Indiana towns and cities. The information was compiled from a series of questions which were sent out by the Commission to all companies in the state.

A summary of the powers of the Indiana Commission and the powers of other state commissions is included.

KANSAS.

Telephone Rates. The Emporia Telephone Company has filed suit in the Shawnee County District Court asking for an order restraining the Kansas Public Utilities Commission from enforcing its recent order, which denied the company's application to increase party-line rates from $1 to $1.25 a month. The company also asks that Attorney-General John S. Dawson be restrained from filing suits to prevent the enforcement of the increased rates. The company contends that the citizens, the city commissioners and the company had agreed on the increased rates in return for $1,200 a year paid by the company in lieu of all taxes. The party-line rates were the only ones that could be raised without a loss of revenue.

MASSACHUSETTS.

The Municipal Light Board of the Town of Wakefield made application to the Board of Gas and Electric Light Commissioners for its consent to establish new maximum rates for gas and electricity, the present rates being alleged to be below cost. The Commission made investigation and found that, while the cost of electricity would be less than the proposed maximum rate, the cost of gas would exceed the rate. The Board holds that gas should not be sold at a loss, since "there is no sufficient reason to believe that a loss so substantial is likely to be absorbed by the increase in output to come from the lower price," and it is business prudence for the town to require that consumers of gas pay all the operating expenses and fixed charges. Due to the fact that after the hearing the town concluded a contract with the Edison Electric Illuminating Company of Boston for the purchase in the immediate future of all of its electricity at a price which should effect some saving in its operating costs, the Board dismisses that part of the petition relating to electricity.

OREGON.

Salem Water, Light & Power Company. The City of Salem complained as to the company's water rates and service. The Commission found that the value of the real and personal physical property of the company, together with its water rights and easements, stores and supplies on hand, all as actually used and useful in the service of the public, was $375,000 on December 31, 1913.

Various rules and regulations are found to be unreasonable. By one of these, the company claims the right at any time to attach meters to the service pipes of patrons at such places, and at such places only, as it may deem best, and to charge for the quantity of water measured, or used, at the meter rates carried by its tariffs, if the same exceed the flat rate applicable, but in any event to exact as a minimum the flat rate provided by its tariffs. With regard to this the Commission says: "This regulation of the defendant is unjust and unreasonable and unjustly discriminatory against patrons so arbitrarily placed on metered services. A just and reasonable regulation and practice for the defendant to follow in the future is, in event it has a meter installed, to charge, impose and collect rates based upon the metered service schedule only, subject to the minimum for metered service, and without reference to flat rates."

The Commission holds that the evidence does not sustain the city's complaint with regard to service.

New Electrical and Mechanical Appliances

Lamp-Dimming Socket.

A new type of the well known Dim-a-lite fitting has recently been put on the market. This is a combination of a fixture socket, a lamp-dimming device similar to the Dim-a-lite, and a shade-holder. It is made to be fastened permanently to the fixture stem with thread and set-screw, and wired to the chandelier or fixture in the same manner as any ordinary socket.

Dim-a-lite Socket.

The standard Dim-a-lite as a portable attachment that can be easily unscrewed from the fixture socket and removed has come into very extensive use. This new type was designed to meet a demand from institutions, hotels and other public places for a similar device that could not be removed or stolen.

The dimming features are the same as in the standard pull-chain Dim-a-lite, but the operation is entirely different. Instead of pulling a chain, to obtain the different degrees of light, a slight turn of the shade is all that is needed to get the five changes of light, designated as: full on, dim, low, night light, and out. By giving the lamp shade one-fifth of a turn, a bright glaring light can be instantly softened to a light more restful and pleasing to the eye. The next one-fifth turn lowers the light to a dim light suitable for a bedroom, sickroom, nursery, etc., and there is a saving of 65 per cent in current consumption. The fourth turn gives a very low night light, such as is needed in a bathroom, or hallway or any other place where an all-night light is needed. At this stage, there is a saving in current of 80 per cent. The fifth turn puts the light entirely out.

Resistor Drum for Socket.

This dimming is effected by means of a series of helically wound resistance coils, properly insulated and connected to contact bars. The resistor drum is but one and one-half inches in diameter and one inch long. The coils are all zero-temperature-resistance-coefficient wire molded under pressure in a stonelike insulating composition, known as Dielite. The wires are well protected from oxidization or mechanical injury, as the wire and Dielite form a solid body. By turning the shade, this resistor drum is rotated, and the various degrees of light are secured, as the point of contact shifts from one commutator bar to the next.

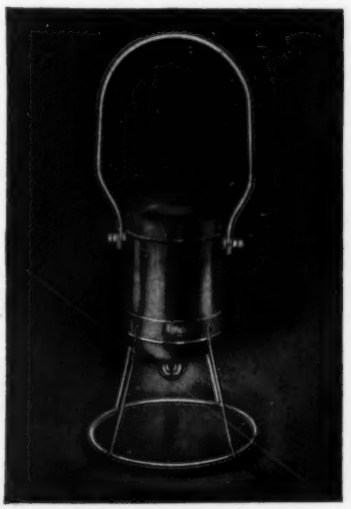
Socket Mounted on Fixture, Showing Operating Method.

One of the most interesting features of this new Dim-a-lite is that the light can be turned on and off without the need of a key or pull chain. The absence of a chain, together with its symmetrical bell shape, makes it a particularly neat and attractive socket for high-grade brackets and chandeliers in residences and other places where appearance is important.

This device is manufactured by the Wirt Company, Germantown, Philadelphia, Pa.

Federal Electric Lantern.

A convenient and useful form of lantern designed to replace the oil lanterns so commonly used by railroad yardmen and train crews, by watchmen, farmers and others, has been placed on the market by the Federal Sign System (Electric), Lake and Desplaines Streets, Chicago. The outfit is entirely self-contained, carrying as the source of current four small dry cells wired in series and joined as a complete unit. The cells are of compact construction and designed for high-efficiency service. The lamp is a special six-volt tungsten lamp manufactured by the company. Its filament is constructed so as to give maximum candlepower with minimum current consumption, thus reducing the maintenance cost of the lantern, according to the manufacturer, fully 50 per cent over what it would be were it equipped with ordinary cells and standard lamp.



Self-Contained Electric Lantern.

The lantern is not built on the order of the common pocket flashlight, but to correspond to the requirements of railroad men and those that are accustomed to use oil or similar lanterns. The new lantern differs from the ordinary flame lantern, however, in that the lamp is mounted at the bottom of the outfit, the lamp being carefully protected by a wire guard which at the same time forms a stand for the lantern. This departure was especial-

ly made with the idea of throwing the light down upon the path or object illuminated. The outfit is made with a folding bail which is hinged so that its upper half can be folded at right angles to the lower half. The wire guard underneath the lamp can be easily telescoped by pushing it upward. The handle can then be dropped down. By this folding of the bail and telescoping of the guard, the total height of the lamp is reduced four to five inches so as to practically equal the height of the battery cylinder only. This collapsible feature is desired particularly to permit railroad men to carry the lantern home in a small handbag. When the lamp is taken out for use again the bail is pulled up and straightened out and the wire guard at the base pulled down, a matter of only a moment's work. The outfit has a convenient switch for turning on the light.

Fig. 1.—Semi-Indirect Ceiling Fixture.

The manufacturer claims that with ordinary household use of the lantern the dry cells will last from six to eight months. If the lamp is in daily use the cells will probably last at least one month. It is claimed that actual use of the lantern has proven that its cost of operation is no more than that of oil or other lanterns, when proper account it taken of the cost of oil, wick, cleaning and refilling needed for the oil burner. Aside from economy the lantern has the striking advantage of being absolutely safe, for which reason it has been called the Federal Safety First lantern. The lantern has been tested out and adopted by a number of railroads for the use of their crews. In this service it has been found to be particularly reliable in that it cannot be blown out by wind, it does not leak and its white light has been found very penetrating.

New Lighting Fixtures.

An extended experience in the design, manufacture and sale of lighting fixtures has shown the Shiras-Chassaing Electric & Manufacturing Company, St. Louis, Mo., that there is a demand for semi-indirect fixtures of a special type to be used in places where the ceiling color or shape is not adapted to the ordinary indirect or semi-indirect fixtures. The company has therefore placed on the market a line of fixtures to meet these special needs. Because there were incorporated in the design features giving excellent visual comfort, these fixtures have been designated by the trade name "Ease-Eye-Lights."

Fig. 2.—Pendent Fixture.

Fig. 1 shows one of the many designs in this line of fixtures. The upper portion is a concave-convex porcelain-enameled surface which serves in place of the ceiling to reflect the light into all parts of the room. On account of the special curvature it gives a very wide distribution, efficiently lighting a large area. The light which passes directly through the translucent glass bowl is well diffused, so as to eliminate glare when a powerful high-efficiency lamp is used. The bowl is supported by three straps that can be easily lifted to release the bowl for thorough cleansing.

In rooms with high ceilings fixtures of the type shown in Fig. 2 are found to be very serviceable. The suspension part of the fixture can be varied in length and design to suit requirements. All of these fixtures, both of the ceiling and pendent types are made in many designs, plain and ornamental, to meet varied tastes and funds available. The bowls are either plain or satin-finished. A porcelain enamel bowl can also be supplied, when complete indirect lighting is desired. The larger bowls, 14 inches in diameter, are adapted for use with the new 400 and 500-watt gas-filled tungsten lamps.

Among other new fixtures manufactured by the firm is what is called the "Stayrite" bed lamp shown in Fig. 3. It is designed especially for convalescent patients and others who enjoy the luxury of reading in bed. The lamp has a hooked band by means of which it can be instantly hung over a bed rail or the back of a chair or other object; it may also be secured to a wall clamp, as in Fig. 3. An adjusta-

Fig. 3.—Adjustable Bed Lamp.

Fig. 4.—Bed Lamp in Use.

ble holder next to the lamp socket permits turning the lamp into any desired direction so that the light will fall upon the printed page, as in Fig. 4. The lamp has a polished aluminum reflector to concentrate the light where needed. It is evident that the position shown prevents direct light and glare from annoying the reader.

Beers Electric Lantern.

A very handy form of electric lantern has been placed on the market by the Beers Sales Company, 1005 Broad Street, Bridgeport, Conn. It is designed for such services as the ordinary pocket flashlight usually can be used for, but also for throwing a strong, steady light in places where an ordinary flashlight would not give sufficiently reliable service.

Beers Electric Lantern.

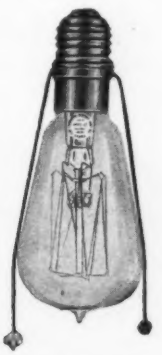
One of the most distinctive features of this lantern is that it can be used with an ordinary single dry cell. This makes the cost of battery renewal very small, as special batteries required for pocket flashlights are usually higher in price and have less life than the standard type of dry cell. The casing for holding the cell is made of heavy rolled brass or of pressed steel with black rubber finish. This makes a very durable outfit without projecting parts. The handles are so shaped and hinged that they can be turned down against the curved side of the casing so as to make the outfit very compact when it is desired to place it in the pocket or tool bag. The battery is easily inserted into the casing by unscrewing the end cap.

Illumination is furnished by a high-efficiency lamp taking only about one-quarter ampere. It gives a clear white light of about 2.5 candlepower; by means of the silver-plated reflector and ground lens the light beam is greatly intensified and projected for a long distance. A convenient contact switch is mounted near the handle, by means of which either steady or intermittent light can be secured by a simple movement of the thumb. If it is desired to secure intermittent light, pressing a button secures this result; sliding the button about a quarter of an inch gives steady light without further attention until the button is returned again.

This lantern has been found very convenient for automobilists, sportsmen, delivery men, farmers and others. It eliminates the dangers from the use of flame lanterns and makes a reliable and powerful outfit.

Hylo-Mazda Lamp.

The well known Hylo lamp with carbon filaments has now been improved on by the development of the Hylo-Mazda lamp, which has both filaments made of drawn tungsten wire. The small filament is concentrated and gives about one candlepower for night lighting of bathrooms, bedrooms, hallways, etc. The large filament takes 25 watts and gives 20 or more candlepower. Pulling of a string changes the circuit from one to the other filament instantly and also turns the lamp out in the same manner as in the older type of Hylo lamp. The energy saving when the small filament is used is about 85 per cent of that used when full light is on. These lamps are manufactured by the Economical Electric Lamp Division, National Quality Lamp Works of General Electric Company, New York City.



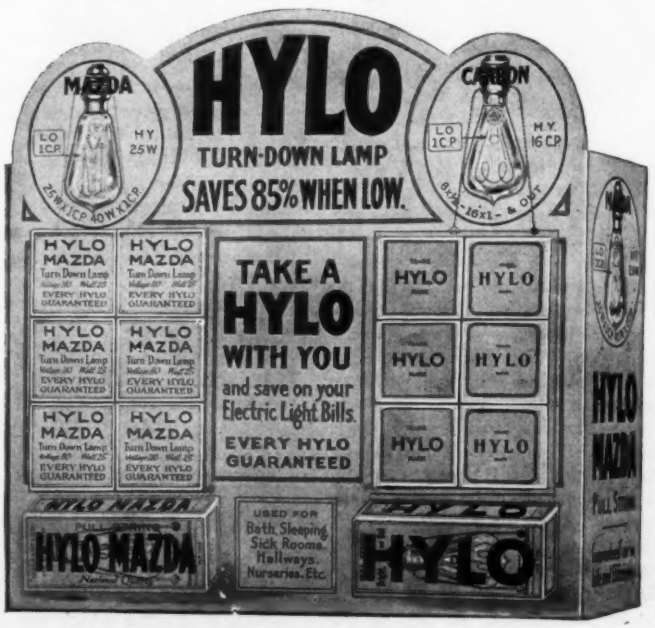
Hylo-Mazda Lamp.

The manufacturer has recently devised as part of its Hylo selling campaign a special counter display box about 18 inches square. This contains six each of the older type Hylo lamps and of the new Hylo-Mazda lamps. This makes an effective appeal to customers visiting the salesrooms of electrical dealers. The company is providing these display outfits to any dealers that desire to use them to promote Hylo sales.

Fixtures for Gas-Filled Tungsten Lamps.

A new line of fixtures designed especially for the new gas-filled tungsten incandescent lamps has been placed on the market by the Risinger Manufacturing Company, East Liverpool, O. These fixtures are made in a variety of forms, some suitable for indoor and others for outdoor service. They are given the trade name of Nitrolite. All of these fixtures are made suitable for 750 and 1,000-watt multiple lamps. They can also be supplied with an Edison adapter to take any standard lamp.

An important feature in all of these



Counter Display Box to Promote Hylo Sales.

fixtures is exceptionally good provision for ventilation. The air enters at a hole in the bottom of the glass globe, passes up around the lamp and socket and emerges from the annular space in the middle of the casing. This circulation has been pronounced by lamp specialists as being exceptionally favorable to the use of high-power lamps, since it keeps not only the lamp but the socket and entire fixture equipment cool.

The fixture shown is one intended for outdoor use in cases where a large reflector is not necessary. Thus for lighting in front of a store, hotel, or

Nitrolite Outdoor Fixture for Gas-Filled Lamp.

theater it serves to light not only the sidewalk but also the front of the building.

The length of this fixture is 21 inches. It is finished in bronze and has a white porcelain-enamel reflector on the inside. The globe is 10 by 8 inches in dimension and is made of an opal diffusing glass which has been found specially suitable for diminishing the high brilliancy of these lamps. The top of the outfit has a specially insulated weatherproof service head and hanger.

The indoor lamp fixtures are equipped with service loop hangers and like the outdoor lamps are wired and completely assembled, so as to be ready to hang when received.

New Switch for Large Heaters.

The Bryant Electric Company, Bridgeport, Conn., has produced a new snap switch especially designed for electric ranges and other electric heating appliances taking up to 2.5 kilowatts.

Instead of increasing the number of coils or elements in operation by throwing them progressively into circuit, as has been the usual custom heretofore, this new switch gives greatest heat at first operation. In other words, assuming the switch to be in the "off" position, the first twist of the knob throws into circuit all the elements it controls. The second position cuts the heat down to medium, the third to low, and the fourth is the "off" position. In this manner, the degrees of heat are provided in the order in which they are most frequently desired, and a much smaller switch than otherwise can be used.

Switch for Large Electric Heaters.

A special feature of this new switch is that the indicating dial, showing whether the switch if "off" or in position 1, 2 or 3, is set at an angle of 45 degrees so as to be visible from any position in front of or above the switch.

Portable Electric Heater.

A new type of electric heater, designed particularly for use in bathrooms, nurseries, sick rooms and other places where it is desired to warm up the apartment on a chilly day, has been placed on the market by the Despatch Manufacturing Company, Minneapolis, Minn. This heater is not intended to be used in place of a furnace, steam or hot-water system for general house heating, but for supplementing such heating equipment in the manner that oil and gas stoves frequently have been used. As compared with these latter two types of heaters it has very marked advantages, among which are absolute freedom from danger of fire due to any flame heater, elimination of vitiation of the air (an important item in small rooms in which many health departments prohibit the use of gas heaters unless connected to a chimney flue), elimination of unpleasant odors and poisonous gases connected with oil or gas heaters.

The new heater is of simple but substantial construction. The base and top are made of cast iron which is well nickeled. The cylindrical casing is made of blue polished steel. In the base air inlets are provided and the air entering here passes over the electric heating element and rising in the casing passes out at the top. This gives a well defined circulation which produces uniform and rapid heating. The casing itself does not become so hot as to burn the hand, thus the heater can be used in children's rooms without danger even to infants.

The heaters are provided with a nine-foot connecting cord with plug attachment for the heater and swivel-socket attachment plug for connection to light-

Portable Electric Heater for Small Rooms.

ing or other circuits. The heater takes 660 watts and is designed for 110-volt circuits; heaters specially wound for 220 volts can also be secured. The space taken up by the heater is less than one square foot of floor area; its height is 18 inches; its weight including attachment plugs and cord is only seven pounds.

General Electric Exhibit at Foundrymen's Convention.

The exhibit of the General Electric Company at the foundrymen's convention at the International Amphitheater, Chicago, Ill., September 5 to 11, includes some of the very important electrically driven appliances that are now considered an essential part of any well equipped, modern foundry.

Notable among the apparatus shown is an arc-welding outfit which finds almost indispensable application in the foundry and machine shop. The outfit is a recently designed, portable type, and consists of a 10.5-kilowatt motor-

generator set and panel mounted on a truck. The voltage impressed across the arc is automatically varied with the length of the arc. The polarities of the electrode and casting are also automatically interchanged when the function of the electrode is changed from heating the break in the casting with carbon to filling it with iron or vice versa. The value of this equipment and its many uses are being demonstrated by an operator throughout the convention.

The problem of compressing air in connection with maintaining fusion uniformly in the cupola is of interest to every foundryman. For this purpose a centrifugal compressor, having a capacity of 4,500 cubic feet of free air per minute and driven by a 30-horsepower induction motor at 3,450 revolutions per minute is on exhibition. Centrifugal compressors may be designed for any commercial volume and pressure. They have a high initial and continuous efficiency and will maintain that efficiency after long periods of service. The characteristics of the type make it especially adaptable for cupola blowing; for the air is delivered from the discharge at a constant pressure, without fluctuation, which results in a steady descent of the charge and uniform melting in the cupola.

A number of motors have also been loaned to other exhibitors for driving direct various machines used in foundry and machine-shop practice. An interesting display among these exhibits is a reversing motor-driven planer equipment. This reversing, adjustable-speed, direct-connected drive has been thoroughly tried out in service and has demonstrated its ability to usher in new records in machining castings.

Several representatives from the Chicago office of the company are in attendance during the convention.

Buffalo Grip as the Lineman's Third Hand.

The lineman who puts up or repairs the wires on telephone and electric light and power poles actually requires

Western Electric Buffalo Grip.

three hands to do his work efficiently —a hand for each wire and a third to do the tying or splicing. The buffalo grip is a tool that does the work of a third hand. Its jaws may be clamped open at any width, the grip held in one hand and the wire inserted, no matter in what position the lineman may be. The patented locking device makes this possible while the rest of the construction is such that pulling only serves to strengthen the grip on the wire. The jaws of extra heavy drop forged steel will not injure the softest wire or insulation. The grip is made with and without pulley attached. It will hold all sizes of wire, bare and insulated, up to and including the No. 0000 B. & S. size.

The fact that the Western Electric buffalo grip gives confidence and insures safety to the lineman and produces good joints has made it the standard for more than 18 years with many of the most progressive telephone and electric light and power companies.

Wireless Receptacles for Pipe Taplets.

The H. T. Paiste Company, Philadelphia, Pa., is now manufacturing Paiste wireless plug receptacles and weatherproof lamp receptacles for use

Plug Receptacle on Pipe Taplet.

on pipe taplets. No tap wires are required; the main wires are bared for half an inch and fastened directly to the binding screws of the fittings. There

Weatherproof Lamp Receptacle.

is plenty of room under the base for a third wire. The base is the same for both the plug and lamp receptacles, so that the caps can be interchanged without taking the base from the taplet.

Pipe Taplet Cut Away to Show Wiring of Bases of Receptacles.

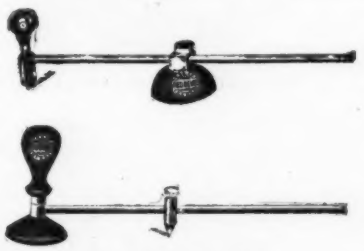
In the lamp receptacle, the screw shell and the contact button are both fastened to the cap instead of to the base. This gives a very rigid receptacle, as the cap is screwed directly to the pipe taplet. As both one-half and three-quarter-inch taplets have the same size openings, only one size of receptacle is needed for both sizes of conduit. For waterproof work, a rubber gasket is furnished for the screw-shell receptacle and, as the base of the receptacle is thoroughly sealed, it is waterproof in every respect.

The Hart & Hegeman Manufacturing Company, Hartford, Conn., is now sole selling agent for Paiste material.

Two New Circular Glass Cutters.

Since the advent of the automobile with its numerous and varied headlamps of all sizes, the demand for circular glass lights for these has increased to a surprising degree.

For the enterprising and economical motorist who wishes to replace his broken lights himself, the Smith & Hemenway Company, Incorporated,



Circular Glass Cutters.

150 Chambers Street, New York City, maker of the widely known "Red Devil" glass cutters and electrical hand tools, has just brought out an effective and handy circular glass cutter at a very moderate price. It will cut circles cleanly and neatly from 2 to 20 inches in diameter; a larger size will cut up to 40 inches. The illustration shown herewith gives a general idea of this practical little cutter. It is simple, but very effective.

To meet the demand for a better tool of this class, the company is also offering a circular cutter, known as style 263, with hand-honed wheels that will cut sharp, clean circles from 2 to 22 inches in diameter. This is a high-class tool in every respect. The strong metal base, around which the cutter revolves, is lined with rubber to prevent slipping. No special deftness is required to cut perfect circles with this tool.

The automobile trade and hardware houses carrying automobile supplies, as also glass dealers, should find a ready demand for a tool of this character. Both cutters are supplied, of course, with the celebrated "Red Devil" cutting wheels, on the high qualities and special cutting powers of which, the company has largely based the excellent business success which it has achieved.

A New Line of Small Ventilating Outfits.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that it has placed on the market a new line of small ventilating outfits for use in motion-picture theaters, restaurants, hotels, bakeries, laundries, stores, offices, public buildings, etc. The line includes two types, Westinghouse Ventura fans and Westinghouse Sirocco blowers.

Motor-Driven Ventura Fan.

Motor-Driven Blower.

The Westinghouse Ventura fan is suitable for mounting in the wall and handling large amounts of free air. The fan differs from the ordinary type in having a larger number of blades, which are mounted on a large central disk and have the ends abruptly turned up. This form, it is claimed by the manufacturer, operates very quietly and with high efficiency. The air is thrown from directly in front of the fan, instead of being widely spread out, and no flow back is possible through the center of the fan. The unit is especially compact and the motor protrudes very little into the room. Great pains have been taken to make the finish attractive.

The motor is a special type, wholly inclosed and with a thrust bearing. It has ample overload capacity to drive the fan with a strong back pressure of wind against it.

Westinghouse Sirocco blowers are designed for use with systems of piping or where some resistance is offered to the passage of the air. They are used for ventilating inside or underground rooms, bank vaults, cabins and engine rooms of steamers and yachts, lavatories, telephone booths, etc. They are also adapted for many blowing operations, such as for air baths, aspiration, removing chips, and so forth. The essential parts are the motor, a Sirocco blower wheel mounted on the motor shaft, a cast-iron housing to direct the air current, and a supporting base.

The blower wheel is a distinctive feature. It has from 36 to 64 narrow blades and an unusually large air outlet, which reduces eddy currents to a minimum. Air is discharged at an unusually high velocity. The blower housing can be revolved and reversed so as to direct the discharge horizontally to either side or vertically up or down. A screw-driver is the only tool needed to make the adjustments. Standard stock sets are arranged as shown in the illustration herewith.

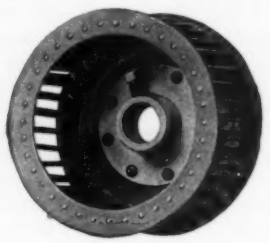
The fans and blowers used on these outfits are manufactured by the American Blower Company, Detroit Mich.

An Electric Cuspidor-Polisher.

The Holcomb electric cuspidor-polisher illustrated herewith is one of the latest electrical time savers for use in the office building, hotel, public building or factory. This outfit has changed a job which formerly took a lot of time and hard, disagreeable labor into a task of but a few minutes. It is claimed by the manufacturer that the average time of polishing a cuspidor with the outfit is about one-half minute. It is also claimed that it eliminates the danger of denting the metal and that a much higher polish can be obtained than is ordinarily possible where cuspidors are polished by hand. In the large building where there are hundreds of cuspidors to be polished every few days, the saving in time and labor is a very considerable item.

Electric Cuspidor-Polisher.

The outfit is manufactured by the J. I. Holcomb Manufacturing Company, Indianapolis, Ind. It consists of a rotating disk with an automatic centering clamping device which holds the cuspidor. The cuspidor is held against a revolving disk by a plunger supported from an iron brace above. The plunger rod does not turn, the block on the end of the plunger being mounted on a belt



Blower Wheel.

of ball bearings. The disk is belt-driven by a motor which is mounted in the base of the truck. The truck is made of oak and is mounted on light-running rubber-tired castors.

In addition to the disk for holding cuspidors, the outfit is supplied with a buffing wheel and grinding disk, for buffing silverware, grinding cutlery, etc. When used as a grinder or buffer the outfit is turned up on end.

The outfits are equipped with ¼-horsepower motors manufactured by the Robbins & Myers Company, Springfield, O. The motor speed is 1,750 revolutions per minute.

Large Electric Shipyard Crane.

One of the largest electrically operated cranes in the world is that in the shipyard of the Harland & Wolff Shipbuilding Corporation, Belfast, Ireland. The machine has a rating of 120 tons, and is used to hoist heavy machinery into the hulls of steamships under construction at the yards.

Outing of General Electric Foremen.

The Foremen's Association of the General Electric Company's plant in Pittsfield, Mass., held its seventh annual outing August 22 at a local park. Baseball games, races, dancing and a band concert furnished diversions.

Plant for Smallest Kansas Town.

Cedar Point, which is said to be the smallest town in Kansas, has let a contract for the building of an electric light plant. The town has a population of 183.

Current Electrical News

NORTH ATLANTIC STATES.

AUGUSTA, ME.—Edwards Manufacturing Company contemplates the installation next spring of a hydroelectric power plant for the purpose of operating its cotton manufacturing plant at the west end of Kennebec dam. The necessary plans and specifications have been made.

MONTPELIER, VT.—At an informal meeting of citizens held recently an important step was taken toward improving the lighting system in the streets of the business section on Main and State Streets.

BROCKTON, MASS.—Edison Electric Illuminating Company has secured rights of way over private lands from the junction of Sumter and Crescent Streets to Perkins Avenue for running a high-tension line.

NORTHAMPTON, MASS.—The Sewer Commissioners of this town have decided on the desirability of establishing an electrically-driven pumping plant in connection with an extension of the sewer service in the Hospital Hill section. W.

CANAAN, N. Y.—The Lebanon Valley Lighting Company is an incorporated concern with a capital of $10,000 to operate in Lebanon and Canaan, supplying a current for light, heat and power. The directors are Frederick W. Munch, Mary Munch, and Joseph McCarthy of Indian Orchard, Mass., and Robert Munch, of Binghamton.

TAUGHANNOCK FALLS, N. Y.—The Ovid Electric Company's plant burned. Address C. D. Rappleye.

OGDENSBURG, N. J.—The borough officials are negotiating with the New Jersey Zinc Company for the extension of lines from the company's power plant at the Marshal mine, to furnish service for street lighting and commercial purposes. P. J. Dolan is mayor.

NATIONAL PARK, N. J.—The Borough Council will install a new street-lighting system on Wesley Avenue, from Grove to Bank Avenue. A.

PITMAN, N. J.—The Borough Council has awarded a three-year contract to the Public Service Electric Company for street lighting. The contract provides for the installation of new 80-candlepower lamps, to be maintained at a cost of $22.50 per year each, burning on all night schedule of 4,000 hours, and one 1,200-candlepower lamp on ornamental pole at Ballard Park. Additional lamps of the latter type are planned. A.

KITTANNING, PA.—$112,0000 in bonds have been voted for a new light and water system. Address the borough clerk for information.

NEW CASTLE, PA.—City Commissioners are planning to erect about 40 additional lamps on different streets here.

SOUTH ATLANTIC STATE.

CRAWFORDVILLE, GA.—J. A. Ingram of the Modern Equipment Company, has submitted to the City Council a proposition for installing an electric lighting plant at a cost of about $4,000.

NORTH CENTRAL STATES.

FRANKLIN, O.—Additional street lamps on the west side of the town will probably be installed. L.

HAMILTON, O.—The city is contemplating extending its lines to the village of Millville, several miles west of here, for the purpose of supplying current to the inhabitants and for street-lighting purposes. L.

SIDNEY, O.—The Sidney Electric Company has been incorporated with a capital of $10,000 for the generation of electricity for light, heat and power, by Charles F. Chapman and others.

HANOVER, IND.—I. A. and J. C. Reed are among the incorporators of the Hanover Light & Power Company, which has an authorized capital of $2,500. G.

QUINCY, ILL.—Improvements to be made by the Citizens' Water Works Company, of Quincy, which have been authorized by the City Council, include the installation of one high-duty electric engine to cost, it is estimated, $7,500, and one low-duty electric pumping engine to cost approximately $2,500. W. R. Gelston is superintendent of the plant. Z.

MANSFIELD, ILL.—A high-tension electric line is to be run from the power plant here for several miles into the country, for the purpose of supplying current to farmers living along the route. Plans are also being made to light several surrounding villages from this plant. Z.

DES MOINES, IOWA.—A franchise has been granted by the State Railroad Commission to the Des Moines Electric Company which gives the right to construct a transmission line from Des Moines to Oskaloosa, with a branch to Knoxville. The right of way already has been secured. Intermediate towns will be supplied with electricity. The line will cost $200,000.

MAQUOKETA, IOWA.—The Maquoketa Light & Power Company applied to the State Railroad Commission for a franchise to construct a transmission line from Maquoketa to Goose Lake, a distance of 17 miles.

SHENANDOAH, IOWA.—There is likelihood that Shenandoah will have a municipally owned electric light plant. A special election has been called at the direction of the council to vote on the question of issuing bonds for this purpose. This resolution carried with it permission for the mayor to employ expert advice to help him work out the general plan, and to determine the amount for which a bond issue would be asked. It is understood that $40,000 is regarded as the maximum amount for which bonds will be asked.

GLADSTONE, MO.—Tuttle & Pike, of Kansas City, Mo., are preparing plans and specifications to construct an electric transmission system from Gladstone to Armstrong.

ST. LOUIS, MO.—Plans to illuminate Franklin Avenue from Twelfth Street to Beaumont, with arc lamps, are being formulated by a West End Business Men's Association.

MARMARTH, N. D.—A franchise has been granted to J. F. Divine and W. J. Johnson to erect and install an electric light, heat and power plant, etc.

OMAHA, NEB.—Members of West Council Bluffs Improvement Club, at a meeting declared intention of starting an agitation for a municipal electric light plant to be run in conjunction with the pump station in West End.

KANSAS CITY, KANS.—Specfications for about $200,000 of machinery for increasing the capacity of the municipal electric light plant are now being prepared, and bids probably will be asked for soon. Bonds to the amount of $450,000 for the plant were voted recently and the total amount, it is said, will probably be used in two years.

SOUTH CENTRAL STATES.

IRVINE, KY.—Clyde Gaines, manager of the local moving picture theater and interested in other ventures, is seeking to have the Town Council amend the electric franchise it recently passed, assuring that body that he will buy it if certain minor changes are made. He projects a smaller plant to light his theater and adjoining business buildings anyway but expects to be able to increase the scope of the plant so as to provide light and power for the whole city. G.

WHITEBURG, KY.—K. U. Surman of Louisville, representing the James Clarke Electric Company, is organizing a company here to build an electric light plant in Whitesburg. Enough stock has already been subscribed to make the plant a success, and it is said the work on the plant will be started immediately.

BIRMINGHAM, ALA.—It is understood that the new jail will install a lighting and heating plant. Address the county clerk for particulars.

GLENWOOD, ARK.—John H. Pedan, Hot Springs, Ark., has a franchise to install an electric light plant.

STUTTGART, ARK.—The Council plans to install or buy a municipal light and water plant. Address E. A. Draeger in regard to this project.

BRYAN, TEX.—O. E. Gammill has municipal permission to install an electric power plant for Bryan-College Interurban Railway.

CLARKSVILLE, TEX.—The City Council has entered into a contract with the Clarksville Electric Light Company for the installation of a system of street lighting for the town.

GAINESVILLE, TEX.—The Texas Power & Light company is constructing an electric power plant here at a cost of $50,000. It will build a system of power transmission lines from the new plant. D.

LAMPASAS, TEX. — Lampasas

Light & Power Company, contemplates the installation of a 50-kilowatt generator.

LAPORTE, TEX.—LaPorte Water, Light & Ice Company, contemplates constructing a three-mile transmission system.

RUNGE, TEX.—The city will construct a new water works system and electric light plant. D.

WESTERN STATES.

BELGRADE, MONT.—Articles of incorporation have been filed for the Springfield Telephone Company. The company will construct a telephone exchange in Belgrade and surrounding territory. The directors are A. E. Cramer, Henry Cramer, J. A. Forswall, and others.

HARLEM, MONT.—The town of Harlem has decided to grant an electric light franchise to R. J. Moore of Glasgow.

RED LODGE, MONT.—Funds are being raised for the electric road of the Red Lodge Carbon & Stillwater Electric Railway; $250,000 is pledged. A. J. Showalter is promoter.

SIDNEY, MONT.—As the result of a conference between Franck C. Hughes, general manager of the Glendive Heat, Light & Power Company, and the Commercial Club of this city, the proposition of the installation of a modern electric lighting system was endorsed, and the Commercial Club recommended that a franchise be granted to the Glendive Company. The Council has decided to submit the question to a vote of the people and in the event it is carried, work on the plant will start without delay. O.

WHITEFISH, MONT.—Bids will be called for soon on an electric light system. Address the city clerk for particulars regarding this installation.

ST. ANTHONY, IDAHO.—The Mesa Power Company has been organized and incorporated here by Max Hebgen, Frank M. Kerr and others. The company is capitalized at $500,000 and it is announced the waters of the North Fork of the Snake River will be developed and utilized. O.

ST. ANTHONY, IDAHO.—The Utah Power & Light Company is preparing to spend $100,000 on improvements to the local power plant, the work being the first of a long series of improvements contemplated by the Company in the development of the Upper Valley. This plant will be used to handle the business developing from this section, and will relieve the Company's plant located at Idaho Falls. O.

CORINNE, UTAH.—A small light plant is to be installed here by the town officials, to be used in connection with the waterworks system, and to furnish light to the town. Bids will be called for at an early date for wiring the town, houses and buildings. Information may be obtained from the city clerk. U.

MOUNT PLEASANT, UTAH.—For some time the proposition of operating an independent telephone system by a local company has been under way. The franchise of the Mountain States Telephone & Telegraph Company expires in February, 1916, and the company is anxious for a renewal of that or a new franchise and promises a great many improvements should it be allowed to continue in the field. Address the secretary for desired information.

PLEASANT GROVE, UTAH.—The City Council held an important meeting recently that may mean the installation of a municipal power plant for Pleasant Grove. The Council arranged for the taking over of the filings on Grove Creek made by James H. Walker and others.

WINNEMUCCA, NEV.—The Nevada Valleys Power Company has applied for a franchise for electric light and power lines throughout Humboldt County. The company's petition asks for the use of all the public highways and the streets of all the unincorporated towns in the County. Power is to be transmitted from the Government plant in Churchill County.

CENTRALIA, WASH.—The Independent Electric Company has petitioned the County Commissioners of Lewis County for a franchise to construct, maintain and operate an electric light and power transmission line over, along and across various highways extending from the city limits of the town of Winlock and Cowlitz road to the intersection of the Cowlitz and Olympia Road, etc. O.

SEATTLE, WASH.—Superintendent Ross included in his estimates $45,000 for materials for placing wires underground, and $25,000 for labor for this purpose. It is probable that the first work undertaken in the south end, where municipal wires are still overhead, will be in the Yesler Way District. Address Superintendent Ross in regard to this improvement.

SPOKANE, WASH.—Plans are on foot for the installation of an electrolier lighting system on Sprague Avenue through the business district, and petitions for this improvement are being circulated at this time. This plan of street lighting is soon to be applied on First Street, from Bernard to Cedar Streets. Commissioner of Public Utilities C. M. Fassett favors the improvement. O.

JUNCTION CITY, ORE.—F. M. Hildreth, local manager for the Oregon Power Company here, is authority for the statement that his company contemplates extending its transmission wires into the farming district west of town in the immediate future. O.

OREGON CITY, ORE.—Franchise to erect and maintain a line of poles from Estacada to River Mill has been granted the Portland Railway, Light & Power Company, by the Clackamas County Court. The franchise covers a period of 25 years. O.

BLOOMINGTON, CAL.—The citizens have voted for electric lighting. The district includes all of the Bloomington tract, and as soon as the Board of Supervisors can advertise for bids and contract for work the lighting system will be installed.

IMPERIAL, CAL.—Manager Bezdecheck, of the Imperial Telephone Company is authority for the statement that the company plans to make improvements and extensions to its system throughout the rural districts to the extent of $50,000. Exchanges are to be established at Seeley, Calipatria and Niland.

PETALUMA, CAL.—It was decided at a recent meeting of the City Council to call a special election sometime in September to vote on issuing bonds for certain municipal improvements, including $10,000 for electroliers.

SAN MATEO, CAL.—The Supervisors of San Mateo County have called an election for September 11, when the voters of Beresford will vote on the question of establishing a lighting district.

NEW PUBLICATIONS.

NIAGARA FALLS.—E. T. Williams, city industrial agent of Niagara Falls, N. Y., has issued a pamphlet entitled "Niagara Falls and the Electrical Age." This contains views, with descriptive matter of the city, the falls and the electrical power plants in the vicinity.

PROPOSALS.

CABLE HANGERS.—Sealed proposals will be received at the Engineer Deport, United States Army, Washington Barracks, D. C., until September 8, for furnishing 8,000 No. O cable hangers, with screws. For further information apply to Joseph Kuhn, lieutenant colonel, engineers.

ELECTRICAL SUPPLIES.—Sealed proposals will be received at the Bureau of Purchases of the Board of Education of the city of Chicago, Room 730 Tribune Building, September 11, for electrical supplies, hardware, etc., for the electrical construction department of the A. G. Lane Technical High School.

LIGHTING FIXTURES.—Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until September 21, for installing lighting fixtures in the United States public buildings at Minneapolis, Minn.; Muskogee, Okla.; Boston, Mass., and San Francisco, Cal. For further information address the supervising architect.

TELEPHONE SWITCHBOARD.—Sealed proposals will be received by the Commissioner of Gas and Electricity, 614 City Hall, Chicago, Ill., until September 11, for furnishing and delivering in position in room 607 City Hall one two-position telephone switchboard strictly in accordance with the provisions of the specifications on file in the office of said officials

LIGHTING FIXTURES.—Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until October 7 for the interior lighting fixtures of a two-story building for the post office at Narragansett Pier, R. I., in accordance with drawing and specification, copies of which may be obtained from the office of the Supervising Architect or the custodian of the site.

ELECTRICAL EQUIPMENT.—Sealed proposals will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until September 22, for furnishing the following electrical equipment: 11,000 feet interior-communication cable, leaded and armored, soft steel, galvanied, as per Schedules 7257 and 7271; 77,600 feet rubber-insulated lighting and power wire for 600 volts or less, as per Schedule 7270; 3,000 feet four-conductor interior-communication cable; 225,000 feet plain double conductor, flexible, insulated; 1,400 key sockets for three-eighth-inch pipe; 300 fiber-lined keyless sockets, one-eighth-inch cap; 9,500 feet leaded and armored twin-conductor wire, soft steel, galvanied, 60,000 centimeters, all as per Schedule 7271; and 320 special porcelain supporting insulators, as per Schedule 7252; one electric blue printing machine, continuous, to print tracings 42 inches wide, as per Schedule 7240. All of the above items are for delivery at the Navy Yard, Brooklyn, N. Y.

NEW INCORPORATIONS.

MILFORD, N. H.—The Souhegan Automobile & Electric Company has been incorporated with a capital stock of $25,000, for the purpose of operating a gasoline and electric garage. W.

MANHATTAN, N. Y.—The Metropolitan Electrical Products Company, Incorporated, has been incorporated, capitalized at $10,000. The incorporators are Thomas J. Crofton, David C. Chaoto, Edward A. B. Timothy.

CHICAGO, ILL.—Garfield Electrical Company has been incorporated with a capital stock of $1,000 to sell electrical equipment and devices. The incorporators are William J. Maher, H. F. Kennedy, H. B. Courchene and William J. Maher.

PATERSON, N. J.—J. Farrant Company has been incorporated with a capital stock of $5,000 to engage in the business of electrical supplies. The incorporators are James Farrant, Henry H. Smart and Emma Farrant, of this place.

CHICAGO, ILL.—Boller Insulated Wire Company has been incorporated, capitalized at $20,000, to manufacture and deal in motors, electrical appliances, wire machinery, etc. The incorporators are Peter Boller, William N. Boller and W. H. Bentley.

NEW YORK, N. Y.—Continental Electric Welding Company, Incorporated, has been incorporated with a capital stock of $20,000. The incorporators are Hugo Tessensohn, William C. Steiger and Heinrich L. J. Siemuno, of New York City.

NEW YORK, N. Y.—Roechling Electric Steel Company, Incorporated, has been granted articles of incorporation, capitalized at $30,000, to deal in electro-steel manufactured by Gebruder Roechling. The incorporators are Max Opp, R. F. Conahan and M. Augden Hills, of New York City.

DOVER, DEL.—The Truax Electric Company has been incorporated with a capital stock of $25,000 to carry on a general contracting and electrical supply business and to do a general electric business in all its branches. The incorporators are Humphrey Lynch, John M. Truax and Joseph Lynch.

NEW YORK, N. Y.—Northern New York Power Corporation has been incorporated with a capitalization of $500,000 for the purpose of manufacturing electricity for light, heat, etc. The incorporators are D. P. Ayars, Wilkes-Barre, Pa.; George H. Hees, Toronto, Ont., and William R. Hees, of New York City.

BECKLEY, W. VA.—The Beckley Utilities Company has been incorporated with a capitalization of $100,000, and will construct plans to provide a water and electric light and power system for the town. G. C. Hedrick, E. L. Ellison, and W. W. Wilkes, of Beckley; and Theodore Swann and J. E. Brown, of Charleston, W. Va., are the men reported being behind the company. L.

FOREIGN TRADE OPPORTUNITY.

INSULATING MATERIAL. — A wholesale dealer in London, England, desires to be placed in communication with manufacturers of ebonite, vulcanite, vulcanized fiber, and other forms of insulating material used in electrical work. Manufacturers desiring to send samples of sheets, rods and tubes, with quotations, should apply to the editor for name and address.

FINANCIAL NOTES.

At Trenton, N. J., Vice-Chancellor Backes appointed G. F. Wright, of Paterson, receiver for the Paterson, Passaic & Suburban Telephone Company. The receiver was applied for by James Kerney, receiver of the Interstate Telephone & Telegraph Company, of New Jersey, which is a creditor for $40,000. The bond of Mr. Wright was fixed at $25,000.

John B. Denis, Samuel L. Fuller, Jerome J. Storrow, composing the committee representing the six-per-cent collateral notes of the Kansas City Railway & Light Company deposited with the committee at the New York Trust Company under an agreement dated August 15, 1912, announce that interest on the notes from March 1 to September 1, 1914, will be paid on the latter date at the New York Trust Company at the rate of seven per cent per annum.

Dividends.

	Term.	Rate.	Payable.
Am. Pr. & Lt. Com..	Q	1%	Sept. 1.
Brooklyn Rapid Tr..	Q	1.5%	Oct. 1.
Chicago Tel. Co.....	Q	$2.00	Sept. 30.
Conn. Pr. Co. pf.....	Q	$1.50	Sept. 1.
Eastern Pr. & Lt. Corp. pf.	Q	1.5%	Sept. 15.
Louisville Trac.	Q	1%	Oct. 1.
Louisville Trac. pf. S-A		2.5%	Oct. 1.
Montana Pr. pf.....	Q	1.75%	Oct. 1.
Montana Pr. Com...	Q	0.5%	Oct. 1.
Wis.-Minn. Lt. & Pr. pf.....	Q	1.75%	Sept. 1.

Reports of Earnings.

The Toronto Hydro-Electric Commission for the first six months of 1914 reports gross income of $741,273, with expenditures as follows: Current, $147,566; maintenance, repairs and management, $268,828; interest, $122,931; depreciation, $108,759; sinking funds, $43,686; net profit for six months, $49,500, equivalent to about six per cent on the investment.

CUMBERLAND COUNTY POWER & LIGHT.

	1914.	1913.
July gross.....	$258,004	$235,247
Net after taxes.....	125,645	119,733
Surplus after charges..	62,351	61,058
Twelve months' gross..	2,470,163	2,232,200
Net after taxes.....	1,043,364	1,004,676
Surplus after charges..	285,438	324,101
Balance after preferred dividends	*147,438	210,101

*Equivalent to 5.5 per cent on common stock.

EAST ST. LOUIS & SUBURBAN.

	1914.	1913.
July gross	$218,659	$224,352
Net after taxes.....	88,445	88,676
Surplus after charges..	27,103	39,073
Twelve months' gross..	2,758,242	2,597,892
Net after taxes.....	1,024,425	1,142,030
Surplus after charges..	393,562	556,170
Balance after preferred dividends	*68,562	206,170

*Equivalent to 1.1 per cent on common stock.

COLUMBUS RAILWAY, POWER & LIGHT.

	July, 1914.	Seven Months.
Gross earnings	$241,965	$1,763,707
Net after taxes.....	85,290	630,159
Surplus after charges....	44,134	314,369
Balance after preferred dividends	23,789	181,954

NASHVILLE RAILWAY & LIGHT

	1914.	1913.
July gross	$184,081	$178,217
Net after taxes.....	73,279	61,135
Surplus after charges..	31,179	22,058
Twelve months' gross..	2,247,867	2,155,735
Net after taxes	859,540	898,729
Surplus after charges..	359,112	448,937
Balance after preferred dividends	234,112	323,937

GRAND RAPIDS RAILWAY.

	1914.	1913.
July gross	$115,756	$118,261
Net after taxes.....	42,448	44,683
Surplus after charges..	28,882	29,608
Twelve months' gross..	1,294,505	1,276,328
Net after taxes.....	456,983	526,825
Surplus after charges..	300,611	348,872
Balance after preferred dividends	225,611	273,872

ATLANTIC CITY ELECTRIC.

	1914.	1913.
Gross earnings	$471,800	$450,759
Net after taxes.....	236,188	232,984
Surplus after charges..	123,126	124,739
Canton Electric:		
Gross earnings	490,486	374,436
Net after taxes.....	233,755	189,327
Surplus after charges..	170,169	135,115
Rockford Electric:		
Gross earnings	486,982	439,382
Net after taxes.....	233,755	230,893
Surplus after charges..	171,024	142,117
Scranton Electric:		
Gross earnings	1,062,859	863,085
Net after taxes.....	638,234	511,529
Surplus after charges..	400,879	326,705
Wheeling Electric:		
Gross earnings	332,318	292,004
Net after taxes.....	161,901	132,303
Surplus after charges..	95,415	77,399

CITIES SERVICE COMPANY.

	1914.	1913.
July gross	$271,637	$127,086
Net after expenses.....	262,674	119,596
Balance after interest..	221,841	106,504
Surplus after preferred dividends	*85,008	42,966
Twelve months' gross..	3,543,736	1,487,344
Net after expenses....	3,446,467	1,412,762
Balance after interest..	3,125,476	1,394,80[illegible]
Balance after preferred dividends	*1,703,351	695,553
Surplus after common dividends	1,000,665	391,198

*July preferred dividend accrued.

Accumulated surplus July 31, 1914, $2,755,718; 11.73 per cent on common stock for 12 months ended July 31.

PORTLAND RAILWAY, LIGHT & POWER.

	1914.	1913.
July gross.....	$511,005	$568,371
Net after taxes.....	230,985	283,997
Surplus after charges..	48,682	112,619
Balance after maintenance	16,963	75,623
Twelve months gross...	6,644,511	6,671,039
Net after taxes.....	3,304,256	3,358,171
Surplus after charges..	1,177,130	1,476,022
Balance after maintenance	*778,983	1,109,799

*Equivalent to 3.1 per cent on capital stock.

GREAT WESTERN POWER SYSTEM.
(Inter-company Business Eliminated.)

	1914.	1913.
July gross	$216,936	$222,348
Net after taxes.....	167,015	161,357
Surplus after charges..	66,042	65,541
Balance after guarantee dividends	53,542	53,041
Twelve months' gross..	2,684,035	2,581,324
Net after taxes.....	1,917,643	1,705,464
Surplus after charges..	729,788	589,587
Balance after guarantee dividends	579,788	439,587

AMERICAN POWER & LIGHT.
Consolidated earnings of subsidiaries:

	1914.	1913.
July gross	$519,825	$448,923
Expenses and taxes...	280,132	239,351
Net earnings	239,693	209,572
Twelve months' gross.	6,331,359	5,584,793
Expenses and taxes..	3,400,469	3,097,631
Net earnings	2,930,890	2,487,162

REPUBLIC RAILWAY & LIGHT.
(And Subsidiaries.)

	1914.	1913.
July gross.....	$252,949	$258,300
Net after taxes.....	105,204	98,184
Surplus after charges and amortiz	47,412	35,247
Balance after preferred dividends....	21,455	9,290
Twelv months' gross.	3,088,496	2,877,424
Net after taxes.....	1,217,702	1,096,907
Surplus after charges and amortiz	518,389	449,283
Balance after preferred dividends....	206,680	137,361

CENTRAL STATES ELECTRIC CORPORATION.
(Cleveland Electric Illuminating Co.)

	1914.	1913.
July gross	$291,488	$290,617
Net after taxes.....	140,847	140,523
Surplus after interest, preferred dividends and bond discount....	105,107	107,449
Balance after depreciation	75,957	79,747
Twelve months' gross..	4,262,682	3,690,428
Net after taxes.....	2,006,323	1,770,332
Surplus after interest, preferred dividends and bond discounts...	1,585,493	1,356,378
Balance after depreciation	1,159,234	946,959

PERSONAL MENTION.

MR. DANA H. HOWARD, general publicity agent, Commonwealth Edison Company, Chicago, is the subject of the biographical sketch appearing in the current issue of *The Graphic Arts,* a publication devoted to the printing and paper industry.

MR. JOHN Z. KELLY has severed his relations with the New York office of the Westinghouse Electric & Manufacturing Company and become associated with the Reliance Electric & Engineering Company, of Cleveland, O., as that company's New York City representative, with offices at 90 West Street.

MR. J. T. TRAWICK has resigned as general manager of the Mississippi River Power Company, at Keokuk, Iowa., to become vice-president and general manager of the United Electric Securities Company, of Boston, Mass. For a number of years Mr. Trawick was with the United company as manager of electric light and street railway companies; after leaving the United he was associated for a time with the Stone & Webster interests, who are associated with the United in a number of companies. Mr. Trawick went to Keokuk in May, 1911. His successor has not yet been named.

MR. PARKER H. KEMBLE, has resigned as manager of the electrical commercial department of the Union Gas & Electric Company, of Cincinnati, O., on account of continued bad health. Mr. Kemble will take a long vacation in an effort to regain his former strength and energy. After a two-weeks' fishing trip in Canada he will start on a motor-houseboat trip down the Ohio and Mississippi Rivers with his family, planning to make numerous side excursions up the Kentucky and other smaller rivers. The company has decided to combine the department of which Mr. Kemble has been the head with the gas commercial department, under the charge of Mr. H. J. HOOVER, who has for some time been manager of the gas department.

MR. GIRARD SWOPE, vice-president and general sales manager of the Western Electric Company, has recently returned from Europe. He made his trip just ahead of the crest of the war wave and he has contributed a very interesting article to the September issue of the *Western Electric News.* There is some very pertinent information regarding the attitude of the people abroad just prior to the outbreak of the war and immediately after the declaration had set mobilization in action. The calling out of the reserves is disclosed and the equipping and quartering of the Belgian soldiers in the Antwerp factory of the Bell Telephone Manufacturing Company, an allied company of the Western Electric, are described. The trip from Antwerp to London by way of Ostend is vividly pictured.

MR. TRUMAN P. GAYLORD, district manager of the Westinghouse Electric & Manufacturing Company at Chicago, has been elected acting vice-president to succeed Mr. Henry D. Shute, who becomes treasurer of the company. Mr. Gaylord was born at Shelby, Mich., and attended preparatory school at Allen Academy, Chicago. He subsequently attended the University of Michigan, and in 1895 received the degree of Electrical Engineer from the Armour Institute of Technology, Chicago. He was engineer of underground construction during the World's Fair at Chicago in 1892 and 1893. At the close of the fair he became assistant professor of electrical engineering at the Armour Institute, which position he retained until 1898, when he became associated with the Commonwealth Electric Company, of Chicago, as electrical engineer. In July, 1899, he entered the employ of the Westinghouse Electric & Manufacturing Company as a salesman, following this line of work until 1902, at which time he was appointed district manager of the Electric Company at Chicago, which position he

T. P. Gaylord.

held until the time of his election as acting vice-president. Mr. Gaylord is a member of the American Institute of Electrical Engineers, the National Electric Light Association, and a number of other engineering and scientific organizations.

MR. HENRY D. SHUTE has been elected treasurer of the Westinghouse Electric & Manufacturing Company to succeed Mr. T. W. SIEMON, who recently resigned to accept the position of secretary-treasurer of the Union Switch & Signal Company, Swissvale, Pa. Mr. Shute, who was born at Somerville, Mass., and was graduated from the Massachusetts In-

H. D. Shute.

stitute of Technology with the degree of Bachelor of Science in electrical engineering, entered the works of the Westinghouse Company in 1893 at Pittsburgh as apprentice, and spent his first two years in the testing department. Following this he was engaged for a considerable time in erection and laboratory work under the direction of Mr. Charles F. Scott and Mr. L. B. Stillwell, later becoming assistant foreman. He entered the engineering department in 1897, and a year later was transferred to the commercial department. In 1901 he was appointed head of the alternating-current division thereof. Two years later he was promoted to the position of assistant to Vice-president L. A. Osborne, in which position he was particularly active in the development of the heavy electric traction and single-phase railway work. He succeeded Mr. Walter McFarland as acting vice-president in 1910. This position he has held until his election as treasurer of the company. Mr. Shute is a member of the American Institute of Electrical Engineers, the National Electric Light Association, Engineers' Club of New York, and is a director of the Pittsburgh Chamber of Commerce, and is closely identified with a number of other technical, civic and social organizations.

MR. HERBERT CARTER, for 12 years manager of the Louisville, Ky., branch of the Western Electric Company and exceedingly popular among the Louisville contractors and electrical men, was the host at a gathering of contractors on Friday evening, August 28, at his home, the occasion being the anniversary of his birthday. The guests reciprocated by presenting Mr. Carter with a superior meerschaum pipe. Among those present were C. C. Childers and Adolph G. Renau, of the Childers-Waters Company; Joseph Reichert, of the American Protection Co.; Joe Neal of the Neal Electric Company; Clarence Albrecht, of Albrecht Sons Hardware Company; W. G. Hesser, of the Fairbanks-Morse Company; E. C. Thurwell, of the Marine Electric Company; Stewart Ottenheimer, of the Home Electric Company; H. Rueff, of Henry J. Rueff & Company; Frank Good, of F. A. Clegg & Company; Paul Tafel, of the H. C. Tafel Electric Company; Joseph B. Wilson, of A. J. Anderson & Company; J. O. Bland of the Bland Electric Company; Charles L. W. Daubert, of the Daubert-Schrecker Company; F. G. Burdorf, of the Burdorf-Brecker Company; and Peter Milner and Claude Bisnote, of the Western Electric Company, Cincinnati branch. The party enjoyed a number of solos by Chester Solomon, a singer who was among the guests.

DATES AHEAD.

Nevada Electrical Association. Reno, Nev., September 7.

Pennsylvania Electric Association. Annual convention, Eagles Mere, Pa., September 8-11. Secretary, S. E. Pohe, Bloomsburg, Pa.

Northwest Electric Light & Power Association. Annual convention, Spokane, Wash., September 9-11. Secretary, Norwood W. Brockett, Puget Sound Traction, Light & Power Company, Seattle, Wash.

American Institute of Electrical Engineers. Pacific Coast convention, Spokane, Wash., September 9-11. Secretary, F. L. Hutchinson, 29 West Thirty-ninth Street, New York, N. Y.

Electrical Supply Jobbers' Association. Regular quarterly meeting, Clifton Hotel, Niagara Falls, Canada, September 9-11. General secretary, Franklin Overbagh, 411 South Clinton Street, Chicago.

Association of Edison Illuminating Companies. Annual convention, White Sulphur Springs, W. Va., September 14-17. Secretary, George C. Holberton, San Francisco, Cal.

Association of Iron and Steel Electrical Engineers. Annual convention, Cleveland, O., September 14-19. Secretary, W. T. Snyder, McKeesport, Pa.

Old-Time Telegraphers' and Historical Association and Society of the United States Military Telegraph

Corps. Thirty-third annual reunion, Kansas City, Mo., September 15-17. Secretary of Old-Timers, F. J. Scherrer, 30 Church Street, New York. Secretary, Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

International Association of Municipal Electricians. Annual convention, Atlantic City, N. J., September 15-18. Secretary, C. R. George, Houston, Tex.

Illuminating Engineering Society. Annual convention, Cleveland, O., September 21-25. Assistant secretary, Joseph Langan, 29 West Thirty-ninth Street, New York, N. Y.

Indiana Electric Light Association. Annual convention, Hotel Severin, Indianapolis, Ind., September 23-24. Secretary, Thomas Donohue, La Fayette, Ind.

New York Electrical Exposition and Motor Show of 1914. Grand Central Palace, New York, N. Y., October 7-17. General manager, George F. Parker, 124 West Forty-second Street, New York, N. Y.

Kansas Gas, Water, Electric Light and Street Railway Association. Annual convention, Arkansas City, Kans., October 22-24. Secretary, W. H. Fellows, Leavenworth, Kans.

American Electrochemical Society. Twenty-sixth general meeting, Niagara Falls, Canada, October 1-3. Secretary, Joseph W. Richards, South Bethlehem, Pa.

American Electric Railway Association. Annual convention, Atlantic City, N. J., October 12-16. Secretary, E. B. Burritt, 29 East Thirty-ninth Street, New York, N. Y.

Jovian Order. Annual congress, St. Louis, Mo., October 14-16. Mercury, Ell C. Bennett, Syndicate Trust Building, St. Louis, Mo.

Electric Vehicle Association of America. Fifth annual convention, Philadelphia, Pa., October 19-31. Secretary, A. J. Marshall, 29 West Thirty-ninth Street, New York, N. Y.

Telephone Pioneers of America. Annual reunion, Richmond, Va., October 29-30. Secretary, Henry W. Pope, New York, N. Y.

Seventh Annual Electrical Show, Coliseum, Chicago, Ill., October 31-November 14. Manager, Homer E Niesz, 72 West Adams Street, Chicago, Ill.

With the Electrical Manufacturers

The Bridgeport Brass Company, Bridgeport, Conn., announces that it is in a position to quote the lowest prices in many years on "Phono-Electric" trolley wire. This is because of the unusually low market price of copper.

The Automatic Reclosing Circuit Breaker Company, Columbus, O., manufacturing a patented circuit-breaker, has increased its capital stock from $15,000 to $40,000, in order to provide the means of expanding its business to meet an increasing demand for its goods.

SKF Ball Bearing Company, 50 Church Street, New York City, is sending out a booklet illustrating and describing the use of its ball bearings on electric motors. The advantages obtained from their use are clearly shown with the aid of many diagrams and half-tone views.

The E. L. Russell Company, State Life Building, Indianapolis, Ind., has published a 28-page loose-leaf booklet describing in detail the construction of a new high-speed rotary-valve internal-combustion engine direct connected to a generator. The company has also published a booklet describing a new rotary valve for internal-combustion engines and its various applications.

Albert & J. M. Anderson Manufacturing Company, Boston, Mass., has issued bulletin No. 29 on Anderson charging plugs and receptacles. This contains 32 pages of well illustrated descriptions of plugs and receptacles for charging storage batteries on electric vehicles, trucks and railway cars. These are of various forms to suit many conditions. They have carrying capacities of 50, 65, 100 and 1,500 amperes, with a voltage range of 100 to 500 volts.

C. & C. Electric & Manufacturing Company, Garwood, N. J. manufacturer of electric motors, generators and electric arc welding equipment, announces the removal of its Detroit offices from 144 Seyburn Avenue to 1111 Chamber of Commerce Building. This office is in charge of R. K. Slaymaker. To handle its increasing business in the Northwest territory, the company announces the opening of a branch sales office in the Security Building. Minneapolis, Minn. This branch will be in charge of R. L. Wells.

The International Electric Tool Company, Milwaukee, Wis., has ready for distribution a new catalog describing and illustrating a complete line of electric vibrators for molding machines, tubs, benches, tubes, plates, core plates, rapping patterns, etc. These electric reciprocating tools and devices take the place of penumatic apparatus. The operating mechanism consists of two solenoids mounted in a steel frame with a steel plunger. The solenoids are alternately and automatically energized and deenergized by direct current through a three-wire circuit.

The Dicke Tool Company, Downers Grove, Ill., now has ready for distribution its new catalog of telephone, telegraph and cable construction tools. Among the tools listed are splicing clamps, climbers, wrenches, splicing tools, come alongs, buffalo grips, pulley blocks, posthole augers, spoons, tamping bars, pike poles, carrying hooks, pole supports, wire reels, tool carts, linemen's tool belts, small tools, etc. Each tool or appliance is illustrated. The company's main office and factory are at Downers Grove; it has sales offices at 61 Broadway, New York City, and the Old Colony Building, Chicago, Ill.

Western Electric Company, Chicago and New York City, has issued an attractive book on Western Electric poles. This contains a well illustrated account of how the principal kinds of poles for overhead electric lines are obtained. The lumbering operations are described for both cedar and chestnut poles. The Northern White Cedar Association's standard specifications for white cedar products are given, also some inspection comments along the same line. Shipping data for northern white cedar poles are tabulated. The standard specifications of the Western Red Cedar Association and specifications for chestnut poles are also included.

The Valentine-Clark Company, Minneapolis, Minn., is tripling the capacity of its open-tank system of butt-treating cedar poles at Minnesota Transfer (St. Paul). The company is a pioneer in the open-tank method of preserving cedar poles, and after seven years of constant development with this method is convinced that cedar poles properly butt-treated eliminate the necessity of substitutes such as steel and concrete. The company claims that leading engineers throughout the country have endorsed properly butt-treated cedar poles as the safest construction for high-tension transmission work. The company carries large stocks in all of its yards, and its officers give every detail of pole production and treating personal attention, insuring the ultimate of satisfaction to its customers. Minnesota Transfer is one of the most advantageous distributing points in the country.

The International-Acheson Graphite Company, Niagara Falls, N. Y., announces to its customers that the production and supply of Acheson-graphite and Acheson-graphite electrodes will not be limited in any way by the European situation. Present indications are that the products into the manufacture of which graphite enters will be made in the United States on a larger scale, and the company suggests that its customers look carefully to their stocks of Acheson-graphite and thus avoid serious inconvenience later should an urgent need present itself. Acheson-graphite electrodes require 10 to 12 weeks in the manufacturing process. Although a large quantity of certain standard sizes is

kept in stock, the full 10 to 12 weeks would be required to make large quantities or special sizes. In the powdered and granular forms, Acheson-graphite does not require so much time in the manufacturing process, and the company will endeavor to maintain ample stocks to meet promptly needs of its customers.

Record of Electrical Patents.

Issued by the United States Patent Office, August 18, 1914.

1,107,245. Automatic Ignition Grounder for Motorcycles. W. E. Bard, Clarksville, Tenn. Spark plug is short-circuited when the machine is abnormally tilted.

1,107,246 and 1,107,247. Electric Switch. F. Barr, New York, N. Y. The first patent relates to a pendent-socket pull switch; the second patent to a rotary snap switch.

1,107,250. Conduit Wiring Device. N. J. Bigham, Detroit, Mich. Fish-wire reel with guide and casing containing revolving disk with spiral groove.

1,107,255. Telephone Transmitter. L. Bradley and H. L. Bradley, assignors to Allen-Bradley Co., Milwaukee, Wis. Includes two graphite plates surfaced with amorphous carbon and graphite granules, the latter also surfaced in the same way.

1,107,257 to 1,107,259. Electrolytic Cell. J. B. Burdett, assignor to Davis-Bournonville Co., New York, N. Y., and Chicago, Ill. Three patents covering modified type of cell units in the form of inverted bells.

1,107,261. Music Generating and Music Distributing Apparatus. T. Cahill, Washington, D. C., assignor to E. Spear, E. H. Jackson, G. F. Cahill, A. T. Cahill and T. Cahill. The Telharmonium, which includes a series of alternators having vibration frequencies corresponding to consecutive notes of the musical scale.

1,107,281. Insulator. R. Friese, assignor to Siemens-Schuckert-Werke G. M. B. H., Berlin, Germany. Condenser-type terminal bushing.

1,107,290. Apparatus for Metering Conversations in Automatic Telephone Systems. G. Grabe, assignor to Siemens & Halske Aktiengesellschaft, Berlin, Germany. Has a relay-controlled meter in the pre-selector circuit.

1,107,309. Process for the Electrolysis and Treatment of Sulphate Liquors. E. J. Hunt and W. T. Gidden, assignors to Chance & Hunt, Limited, Oldbury, England. In electrolysis of zinc sulphate with a lead anode means are provided to prevent solid particles of lead compounds from passing to the cathode.

1,107,316. Thermostat. F. Kuhn and F. E. Shailor, assignors to American Electrical Heater Co., Detroit, Mich. Thermostatically controlled friction lock for pawl and ratchet cutout.

1,107,318. Electrical Plug Connector. F. Kuhn, Detroit, Mich. Metal-incased cord-terminal plug for connecting to heating devices.

1,107,319. Electrically Heated Radiator. F. Kuhn. A hollow sheet-metal jacket contains vertical, narrow, parallel heating coils.

1,107,320. Electrical Heating Unit. F. Kuhn. An insulated unit clamped between armored plates.

1,107,321. Electrically Heated Hot-Plate. F. Kuhn. Has special stand with switch.

1,107,322. Electrical Heater. F. Kuhn, Foot-warmer.

1,107,323. Electric Heater. F. Kuhn and F. E. Shailor, Detroit, Mich.; said Shailor assignor to said Kuhn. Toaster stove with exposed glowing heating coils protected by a surface grid.

1,107,333. Electric Heater. G. H. Mansfield and C. W. Wild, Canton, O. Has air intake and reflector.

1,107,336. Printing Telegraph. F. R. McBerty, assignor to Western Electric Co. Includes a selecting circuit with branches having a type magnet in each.

1,107,365. Printing Telegraph. C. E. Scribner, and F. R. McBerty, assignors to Western Electric Co. Two direct-current impulses and an intervening interval of no current govern electromagnetic switches for the type magnets.

1,107,366 and 1,107,367. Telegraph Receiver. C. E. Scribner, assignor to Western Electric Co. Two patents covering details of printing-telegraph equipment.

1,107,371. Telephone System. C. A. Simpson, assignor to Kellogg Switchboard & Supply Co., Chicago, Ill. A universal cord circuit has special supervisory relays and a switching relay for each end of the circuit.

1,107,374. Attachment for Installing Magnetos on Gas Engines. W. G. Swift, Providence, R. I., assignor of one-half to G. F. Bohl. For Ford automobiles.

1,107,381. Electropneumatic Brake. W. V. Turner, assignor to Westinghouse Air Brake Co., Wilmerding, Pa. Electrically controlled means for venting air from the brake pipe.

1,107,401. Electrical Coupling. C. H. Bissell, assignor to Crouse-Hinds Co., Syracuse, N. Y. A two-piece pivoted band passes around the cable and is clamped by a nut.

1,107,405. Power Meat-Saw. C. E. Brooks, Redlands, Cal. Motor-driven.

1,107,438. Selenium-Cell Regulator. M. Moskowitz, New York, N. Y., assignor to Central Trust Co. of New York. Variation of light on the cell electromagnetically affects the resistance of the main lighting circuit.

1,107,441. Vulcanizer. M. W. Olson, Galesburg, Ill. Has an electrically heated water tank.

1,107,478. Electric Furnace and Method of Operating the Same. R. A. Bayard, Niagara Falls, N. Y. Electrodes mounted in the end walls.

1,107,495. Electrically Operated Musical Instrument. C. Coleman, assignor to G. B. French, Boston, Mass., and F. L. Hall, New York, N. Y. Automatic piano action.

1,107,498. Spark-Plug Tester and Terminal. H. Dalitz, Seattle, Wash. Has means for short-circuiting the plug.

1,107,499. Junction Box. C. W. Davis, assignor to Standard Underground Cable Co., Pittsburgh, Pa. Has an explosive fuse and an orifice in the wall of the box closed by a disruptable cover.

1,107,530. Carriage-Return Mechanism. G. W. Knoll, assignor to J. T. Underwood, Brooklyn, N. Y. Motor-driven carriage return for typewriter.

1,107,536. Relay. F. R. McBerty, assignor to Western Electric Co. For telephone service.

1,107,552. Braking System. W. Schaake, assignor to Westinghouse Electric & Mfg. Co. An electrically operated rail brake.

1,107,584. Lightning Arrester. A. W. Burke, Wilkinsburg, Pa. Connected to the line is a triangular spiral forming a choke coil, one edge of which adjoins a grounded arc horn.

1,107,555. Control System for Electric Motors. C. G. Tarkington, assignor to Westinghouse Electric & Mfg. Co. A direct-current generator connected to the main alternating-current motor governs a limit switch.

1,107,559. Winding and Rewinding Mechanism for Music Sheets or Records. E. T. Turney, assignor to Turney Co., Chicago, Ill. Motor-driven.

1,107,560. Music Sheet or Record. E. T. Turney, assignor to Turney Co. Has means on the record for moving a valve to break the circuit of the operating mechanism.

1,107,608. Safety Gate for Elevators. J. F. Hantke, Los Angeles, Cal. All gates must be closed before the elevator motor can be started.

1,107,610. Annunciator Drop. W. W. Henry, assignor to S. H. Couch Co., Atlantic, Mass. Has special stop to compel drop to remain in thrown position.

1,107,618. Storage-Battery Plate. M. Krokavetz, Cleveland, O. Has a number of trough-shaped holders for active material.

1,107,634. Spark Plug. H. S. Thomasson, Portland, Iowa. Covers details.

1,107,645. Circuit-Closer. B. Benedict, assignor to Beacon Miniature Electric Co., New York, N. Y. For portable flashlight.

1,107,646. Electric Switch. B. Benedict, assignor to Beacon Miniature Electric Co. Modification of the above.

1,107,649. Illuminating Device. A. W. Beuttell, New York, N. Y. An elongated reflector of parabolic form with tubular incandescent lamp at the focal axis.

1,107,650. Incandescent Lamp. A. W. Beuttell, New York, N. Y. Tubular lamp with straight axial filament having tension spring and anchor in the middle.

1,107,651. Stage-Lighting Device. A. W. Beuttell, London, and J. A. Manners-Smith, Haslemere, England. Footlights composed of parallel rows of tubular lamps and reflectors, the latter arranged to screen the filaments from the actors and to reflect diffusively.

1,107,654. Horn. C. Carson, Detroit, Mich. Electromagnetically actuated automobile signal.

1,107,661. Pneumatic-Dispatch-Tube Apparatus. M. L. Emerson, assignor

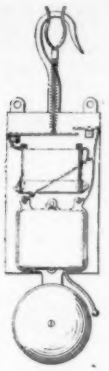
to American Pneumatic Service Co., Boston, Mass. Electrically operated unloader for the constantly operating motor-driven blower.

1,107,666. Insulated Rail Joint. L. Griffith, Yonkers, N. Y. Filler member composed of an insulating sheet.

1,107,670. Electrometric Appliance. W. Jandus, Cleveland, O. A hot-wire instrument.

1,107,697. Signal System. E. E. Mullvain, Los Angeles, Cal. Electric lamp signals for automobiles.

1,107,767. Burglar Alarm. A. P. Dick, Jr., Clarksville, Tex. Portable self-contained electric alarm for hanging on the door knob. (See cut.)



1,107,767.—Portable Burglar Alarm.

1,107,794. Auxiliary Signal Device. R. Ireland, Edison, O. Auxiliary to an alternating-current bell is a direct-current bell.

1,107,811. Electric-Light Bracket. C. W. Lucas, assignor to Faries Mfg. Co., Decatur, Ill. Includes means for clamping the bracket to a piece of furniture.

1,107,814. Electric Drying Apparatus. W. K. Mason, assignor to J. W. Burnett, Cambridge, Mass. Electric comb with thermostatic control.

1,107,818. Trolley Harp. E. J. McCarty, assignor to T. J. McNamara, Clinton, Mass. Has specially lubricated bearings for the trolley wheel.

1,107,861. Refillable Fuse. C. N. Stout, Hamilton, Ont., Canada, assignor of one-half to G. Morris. Has double tubular casing, the two tubes being rotatable on each other so as to bring side openings in each into line. (See cut.)

1,107,861.—Refillable Fuse.

1,107,875. Illuminating Sign Letter. M. W. Askin, Edgewater, Colo. A spherical casing containing electric lamps.

1,107,914. Apparatus for Governing the Speed of Motors. W. W. Dean, assignor to Kellogg Switchboard & Supply Co., Chicago, Ill. Includes a vibratory contact in a shunt about a resistance in series with the motor field.

1,107,932. Means for Preventing Sparking in Electrical Devices. L. Grubman, New York, N. Y. A commutator is arranged to govern a magnetic field by reversing part of the windings.

1,107,945. Fire and Burglar Alarm. H. Hesse, Easton, Pa. Electric system governed by position of the doors.

1,107,951. Incandescent-Lamp Socket. H. Hubbell, Bridgeport, Conn. A ribbed locking arrangement between cap and shell.

1,108,025. Snake-Puller. F. A. Thies, New York, N. Y. A sleeved plug is pulled through conduit by a cord-drawn stem with knob pressing the snake against the inside of sleeve.

1,108,028. System of Electrical Selection. N. L. Tolvstad, Groton, S. D. The line is shunted by a set of local selective resistance circuits.

1,108,036. Rear Signal for Vehicles. M. F. Walsh, New York, N. Y. Electrically moved targets for automobile.

1,108,050. Compound Transformer. W. J. Williams, Albany N. Y. Has three-legged core with different ratios of primary and secondary windings on two of the legs.

1,108,052. Signal Device for Automobiles. A. Winton and H. B. Anderson, assignors to Winton Motor Carriage Co., Cleveland, O. Electric signal controlled by push-button on the steering column.

1,108,053. Portable Electric Fan. T. R. Wiwi and J. W. Fassett, Denver, Colo. Battery and motor are mounted in the casing and the fan at the end.

1,108,062. Votive-Offering Stand. G. B. Bohne, West Hoboken, N. J. Includes a cash box with electric alarm.

1,108,084. Block System for Tramways. D. D. Samaia, Milan, Italy. Electromagnetically controlled semaphore.

1,108,086 and 1,108,087. Dynamo. E. M. Tormin, assignor to Holtzer-Cabot Electric Co., Brookline, Mass. A variable-speed dynamo with means whereby the output for speeds beyond the critical value is either constant or decreases.

1,108,088. Centrifugal Switch. E. M. Tormin, assignor to Holtzer-Cabot Electric Co. When the machine attains a certain speed the segments of the collector ring are short-circuited.

1,108,109. Telegraph System. A. H. Adams and A. F. Dixon, assignors to Western Electric Co. Printing telegraph.

Issued by the United States Patent Office, August 25, 1914.

1,108,145. Electroplating Apparatus. J. T. Daniels, assignor to Hanson & Van Winkle Co., Newark, N. J. Includes conveyor screws mounted on the tank and hangers carried by the screws and extending into the bath.

1,108,147 and 1,108,148. Telegraphy. P. B. Delany, assignor to Telepost Co., New York, N. Y. Automatic chemically recording telegraph system.

1,108,149. Electropneumatic Brake Valve. H. Dewson, assignor to Westinghouse Air Brake Company, Pittsburgh, Pa. Has means for controlling the brakes pneumatically and electrically.

1,108,155. Insulating Fabric. G. H. Ellis, assignor to Northern Insulating Co., St. Paul, Minn. Composed of shredded fibrous stock felted together, the fibers being also provided with a fuzz.

1,108,165. Connector. C. E. Godley, assignor to Edmunds & Jones Mfg. Co., Detroit, Mich. For electric automobile-headlight.

1,108,166. Moistureproof Telephone Set. C. E. Hague, assignor to Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y. For mines, tunnels, etc.

1,108,182. Engine or Motor. V. D. Kelley, Newark, N. J. Electrically heated engine model.

1,108,185. Store-Service-Credit-System Apparatus. C. F. Kettering, assignor to National Cash Register Co., Dayton, O. An electrically-controlled stamping device associated with a private telephone system.

1,108,190. Electrical Display Device. H. A. Kunitz, Pittsburg, Pa., assignor of one-half to W. T. Cahoon. Motor-driven rotary frame carrying Geissler tubes.

1,108,194. Coin-Controlled Automatic Telephone-Exchange System. W. W. Leach, assignor to Western Electric Co. Automatic prepayment equipment.

1,108,195. Trolley. W. M. Learned, Los Angeles, Cal., assignor of one-third to J. H. Mixer and one-third to W. Jochum. Has a pair of wheels arranged at an angle to each other.

1,108,253 and 1,108,254. System of Remote Control. W. M. Scott, assignor to Cutter Electric & Mfg. Co., Philadelphia, Pa. Circuit-breaker with electromagnetic trip and remote-controlled motor for resetting.

1,108,259. Fitting for Electrical Conduits. K. Sixma, Brooklyn, N. Y. Nipple, bushing and locknut on junction box.

1,108,285. Pneumatic Drier. J. M. Ward, Washington, D. C. Contains electric heating element and electric fan, both controlled by a foot switch.

1,108,305. Telephone Signaling Apparatus. D. D. Wright, San Francisco, Cal. Automatic outfit for producing a code signal.

1,108,309. Insect-Exterminator. E. A. Allen and F. A. Speenburg, Denver, Colo. Electrically charged bars for electrocution.

1,108,312. Twisting Machine. G. A. Anderegg, assignor to Western Electric Co. Equalized rotating frame for twisting telephone pairs, etc.

1,108,320. Electric-Current-Controlling Apparatus. A. E. Berdon, Indianapolis, Ind. Lighting-generator regulator.

1,108,350. Electric Conductor. F. Färber, Dortmund, Germany. Connecting wires between battery and electric safety lamp consist of fusible metal.

1,108,359. Electric Switch. M. Guett, assignor to Hart & Hegeman Mfg. Co., Hartford, Conn. Push-button switch for panelboard.

1,108,383. Telephone-Exchange System. F. R. McBerty, assignor to Western Electric Co. Includes a selector with special test circuit.

1,108,394. Trolley Guard. R. L. Queen, Millville, N. J. Guard jaws on each side of the wheel.

1,108,398. Signal. O. W. Sammt, Lake Park, Iowa. An oscillating arm with electric lamp.

1,108,401. Electric Test Meter. G. A. Scheeffer, assignor to Roller-Smith Co., New York, N. Y. Includes fixed resistances to produce armature speeds corresponding to different meters to be tested.

1,108,410. Electroplating Apparatus. E B. Stone, assignor to American

Hardware Corporation, New Britain, Conn. Includes a traveling carrier for the articles to be plated.

1,108,439. Motor Controller. A. J. Horton, assignor to Cutler-Hammer Mfg. Co., Milwaukee, Wis. Solenoid-operated speed regulator with adjustable limit to obtain different predetermined speeds.

1,108,442. Magneto Armature. D. B. Hughes, assignor to Citizens Savings & Trust Co., Cleveland, O. Laminated core extends crosswise between the two parts of the casing.

1,108,453. Lighting Fixture. G. A. Macbeth, Pittsburgh, Pa. A holder carried by the stem supports both canopy and shade. (See cut.)

1,108,468. Adjuster for Flexible Pendants. R. J. Norton, Washington, D. C. Clamp and pulley arrangement.

1,108,470. Electric Pneumatic-Pressure Control. E. K. Parker, Santa Barbara, Cal. Electromagnetically controlled valve.

1,108,482. Telephone System. C. S. Winston, assignor to Kellog Switchboard & Supply Co., Chicago, Ill. Automatic system with selector and connector switches.

1,108,516. Ratchet Mechanism for Electric Switches. J. G. Peterson, assignor to Manhattan Electrical Supply Co., Jersey City, N. J. Details of construction.

1,108,529. Telegraph System. C. R. Underhill, assignor to Underhill Telegraph Translator Co., Jersey City, N. J. A receiving telegraph instrument with a pair of reciprocally operated selectors.

1,108,545. Telegraph Apparatus. G. P. Blessing, Seattle, Wash. Special relay.

1,108,547. Socket Shell. T. A. C. Both, assignor to Zee Socket & Mfg. Co., Boston, Mass. Special means for holding the insulating lining within the cap.

1,108,552. Toast-Turner. H. B. Copeman, assignor to Copeman Electric Stove Co., Flint, Mich. Pivoted grid on each side of vertical electrical toaster permits turning the bread without touching it.

1,108,553. Toast-Turner. L. G. Copeman, assignor to Copeman Electric Stove Co. Similar device for horizontal toaster.

1,108,554. Toaster. L. G. Copeman. assignor to Copeman Electric Stove Co. Includes a modified form of toast-turner.

1,108,563. Motor Controller. C. T. Evans, assignor to Cutler-Hammer Mfg. Co. Special overload and low-voltage relay protection.

1,108,568. Dynamo-Electric Machine. V. A. Fynn, assignor to Wagner Electric Mfg. Co., St. Louis, Mo. The width of the tooth crowns of the stator is equal to the tooth pitch of the rotor. (See cut.)

1,108,580. Printing Telegraph. D. S. Hulfish, assignor to McMeen & Miller, Chicago, Ill. Includes switching contacts controlled by a vibrating reed.

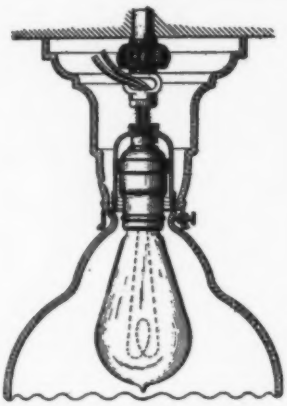
1,108,584. Train-Controlling Mechanism. F. T. Jones, assignor to Jones Safety Train Control System Co., Baltimore, Md. Electric block system with electromagnetic operation of brakes controlled from track circuits.

1,108,605. Automatic Sectionalizing Switch. J. E. Molony, assignor to General Electric Co. Special circuit-breaker for sectionalizing feeders.

1,108,609. Engine Starter. R. Nelson, San Jose, Cal. Includes an accelerator for ignition dynamo.

1,108,638. Electro-Optical Cell. C. Stille, Berlin, Germany. Consists of acetone as electrolyte, one electrode plate of pure aluminum and another of aluminum coated with an alloy of gold and selenium.

1,108,641. Operating Means for Electric-Lamp Switches. A. J. Tizley, assignor to E. F. Caldwell & Co., New York, N. Y. Details of socket switch.



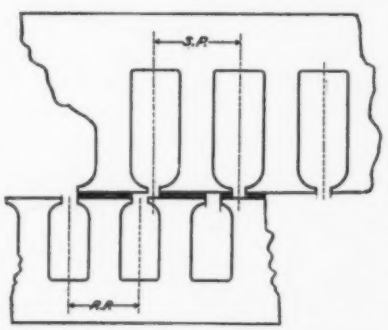
1,108,453.—Canopy and Shade Holder.

1,108,652. Street and Station Indicator. C. O. Young, Chicago, Ill. Solenoid-operated.

1,108,665. Ignition Device. S. N. Ayres, Plainfield, N. J. Electric gas-igniter.

1,108,674. Terminal Connector for Spark Plugs. C. W. Beck, assignor to Michigan Motor Specialties Co., Detroit, Mich. Sleeved terminal.

1,108,678. Lamp-Socket Casing. R. B. Benjamin, assignor to Benjamin Electric Mfg. Co., Chicago, Ill. Special means for locking cap and shell.



1,108,568.—Stator and Rotor Teeth.

1,108,679. Suspension Fitting. R. B. Benjamin, assignor to Benjamin Electric Mfg. Co. Suspension hook for outdoor lamp has bushed terminals for the lamp circuit.

1,108,686. Electrotherapeutic Fluid Electrode. H. Bonis, Listowel, Ont., Canada. Porous cup-shaped terminal.

1,108,739. Electrical Igniting Device for Internal-Combustion Engines. E. Gassmann, assignor to Eisemann Magneto Co., Brooklyn, N. Y. Regulating device for magneto.

1,108,744. Photographic-Printing Apparatus. N. J. Goldfarb, New York, N. Y., assignor of one-half to P. Rabinowitz. Includes electric lamps.

1,108,745. System of Phase Transformation. F. C. Green, assignor to General Electric Co. Consists of two groups of transformers, one delta-connected and the other Y-connected to a three-phase system, the secondaries of each group being double-delta-connected.

1,108,746. Means for Preventing Condensation of Moisture in Transformer Tanks. F. C. Green, assignor to General Electric Co. An electric heating element attached to the inside of the cover of the tank.

1,108,750. Combined Alarm and Electric Light Switch. J. G. Harrison, Goldfield, Colo., assignor of one-half to U. C. Harrison. Lamp and alarm circuits are closed at the same time.

1,108,753. Fire-Alarm. F. Herbeck, Athol, Mass. Fusible circuit-closer in an annunciator circuit.

1,108,782. Electric Signaling Device for Elevators. F. S. Payne, assignor to Elevator Supply & Repair Co., Chicago, Ill. Restoring devices are controlled by gate-operated switch.

1,108,793. Variable Mercury-Condenser. R. S. Martin, Habana, Cuba, assignor of one-half to J. Aballi. An electric condenser with adjustable mercury column in glass tube.

1,108,822. Railway-Crossing Signal. W. P. Adelta and O. M. Adelta, Dallas, Texas. Electric lamp and bell and motor-driven blades rotating in front of lamp.

1,108,847. Ringer and Secret-Service Device. J. G. Neff and C. A. Neff, Davey, Neb. Step-by-step selective ringing for party-line telephones.

1,108,872. Magneto Generator. R. G. Kirchner, Detroit, Mich. Includes an armature coil, an extension coil and circuit-breaker in series therewith, and a condenser rotating with the armature and shunt to the circuit-breaker.

Patents Expired.

The following United States electrical patents expired August 31, 1914:

588,997. Electric Alarm and Call-Bell, F. C. Jordan, Wadsworth, O.

588,999. Electric Meter. E. J. King, Fort Wayne, Ind.

589,015. Electrical Body Appliance. J. P. McGill, Chicago, Ill.

589,042. Storage Battery. W. J. Still, Toronto, Canada.

589,048. Electric Dental Furnace. C. A. Timme, New York, N. Y.

589,073. Electric Regulator for Dynamos. W. H. Chapman, Portland, Me.

589,093. Automatic Switch for Railroads. L. A. Moore, Brooklyn, N. Y.

589,112. Electric Car-Lighting System. F. M. Bennett, New York, N. Y.

589,115. Outlet-Box for Gas Pipes and Electrical Conduits. W. J. Billings and M. Mauer, New York, N. Y.

589,130. Electric Headlight. J. Kirby, Jr., Dayton, O.

589,162. Brush for Dynamos. F. J. Chaplin, Birmingham, England.

589,170. Railway Signal. C. W. Grant, Concord, Mass.

589,186. Means for Operating Generators and Storage Batteries in Conjunction. W. Meredith and A. M. Hunt, San Francisco, Cal.

589,256. Process of Making Insulating Material. J. Gray and C. H. Case, South Manchester, Conn.

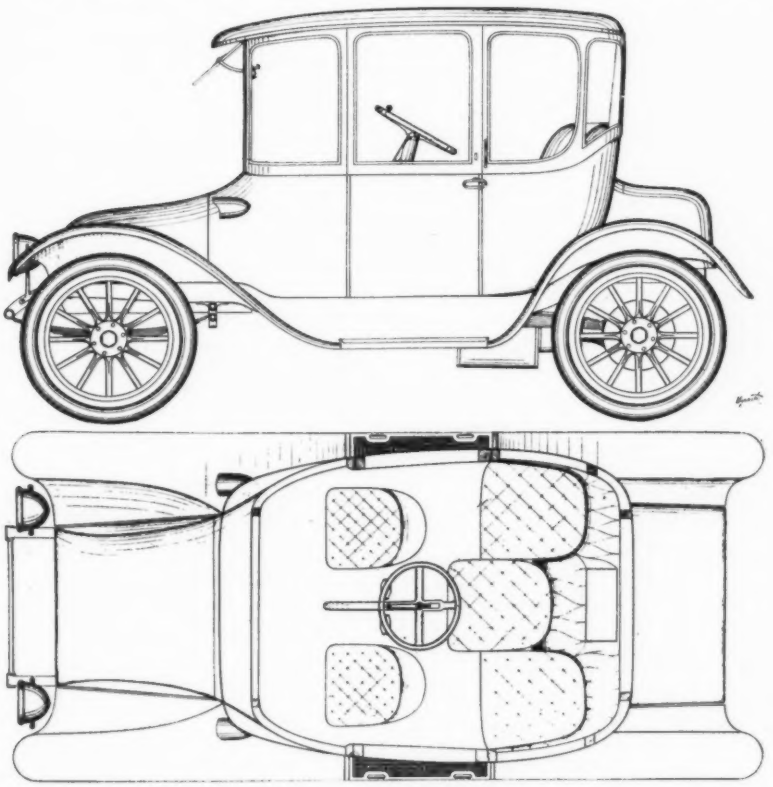
589,347. Electric Piano. J. L. Fulkerson, Kansas City, Mo.

Electric Vehicle Section

Buffalo Electric Vehicle Company Exhibits New 1915 Model.

The Buffalo Electric Vehicle Company, Buffalo, N. Y., manufacturer of the Buffalo-Babcock electrics, gave a test demonstration of its new 1915 vehicle to a party of automobile experts, electrical engineers, capitalists, daily newspaper representatives and representatives of the technical press, at Buffalo on Friday, August 21.

The test car was a five-passenger brougham. The illustrations herewith indicate clearly the appearance of the car and its seating arrangement.



Side View and Plan of Seating, Buffalo Electric Vehicle Company's 1915 Brougham.

The Buffalo Electric Vehicle Company insofar as its pleasure vehicle is concerned, is committed to the policy of presuming that the electric is essentially a town car which, however, may be satisfactorily used for country runs of reasonable distance. The desirability, therefore, has been recognized of producing a car which will make its maximum mileage per battery charge at the speeds most generally used in city driving. At the same time it has considered the desirability and necessity of a simplified method of operation and control.

In the design of the 1915 Buffalo electric the old style control lever has been eliminated. The steering post is located directly in the center of the car. This gives the driver a clear, unobstructed view from every angle. The control lever is located on top of the steering wheel, and is similar in appearance and operation to the gas throttle on a gasoline car. The control lever is connected with an exclusively designed controller which is inclosed in a dust, water and oil-proof housing at the base of the steering column.

This control has no fixed speed positions as the circuit remains unbroken from the lowest to the highest point, which makes arcing and sparking positively impossible from careless or improper manipulation, and controls the car at all speeds from 9 to 20 miles.

For starting, a patented foot control which takes care of speeds up to nine miles per hour is used. With the car the greatest efficiency, as regards mileage, is obtained at speeds ranging from 11 to 15 miles per hour, as follows:

At 11 miles per hour, 77 miles per battery charge.

At 12 miles per hour, 76 miles per battery charge.

At 13 miles per hour, 75 miles per battery charge.

At 14 miles per hour, 73 miles per battery charge.

At 15 miles per hour, 71 miles per battery charge.

The above figures are averages taken from various tests made with a five-passenger stock car with standard battery equipment, carrying a capacity load and working out in current consumption approximately 65 watts per ton-mile.

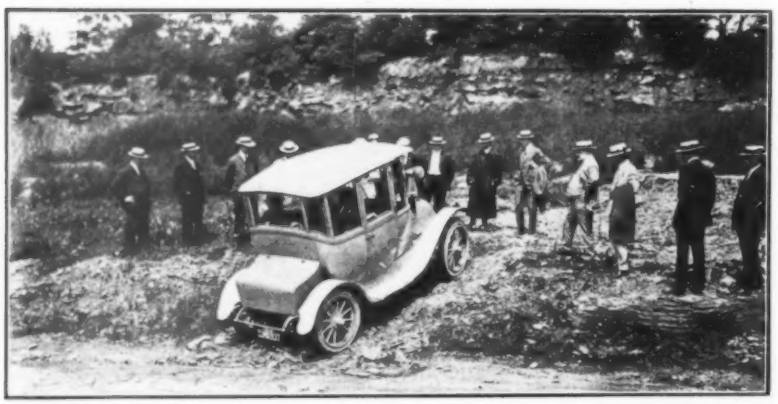
The same car negotiates a 15-per-cent grade at a speed of 7.5 miles per hour at 108 amperes, and on a recent test covered 26 miles on a current consumption of 50 ampere-hours, the car weighing 4,000 pounds and carrying five passengers.

With the motor, designed by F. G. Peck, electrical engineer of the company, by means of external resistance in the field circuit the field current can be varied independently of the armature current. A decrease of field current causes the armature speed to increase, and an increase of field current causes a decrease of armature speed. As the average field current is small in comparison with the average armature current the field resistance loss is small, and as the field resistance may be provided with a large number of steps, this method offers an efficient and flexible speed control without changing the applied voltage. Eighteen steps are provided in the field resistance in this new Buffalo Electric control, giving as many changes of speed, ranging from 9 to 20 miles per hour.

A foot pedal is used for starting and stopping, which, when thrown forward, cuts off the current and applies the brake. Releasing this pedal causes the following operations to take place in

the order named. The brake is released, a switch is closed connecting the motor to the battery through a starting resistance, the starting resistance is cut out step by step until when the pedal is entirely released the battery leads are connected direct with the motor. At this point a speed of nine miles per hour has been attained and the higher speeds are taken care of through the speed lever located on top of the steering wheel.

It is seldom necessary to use the mechanical brake, except for starting and stopping as advantage is taken of the electric brakeing efficiency of the motor. When the car is being propelled at a given speed the motor, due to its speed, has a certain voltage, or counter-electromotive force slightly lower than the battery voltage. When starting on a down grade the motor speed increases until its voltage exceeds the battery voltage and a charging current is thereupon forced through the battery. This increases



The Buffalo Electric Appears to Have Unlimited Power—Negotiating a Ditch.

until the motor, now running as a generator, has a counter torque opposing and equal to that supplied by the momentum of the car which will continue down the grade at no appreciable increase in speed, acceleration being prevented by the electric brake action.

As another example of the electric braking efficiency of the motor, assume that the car is running along a level stretch of road at say 15 miles per hour. Wishing to slow down upon approaching a crossing or congestion of traffic it is only necessary for the driver to shift the control or speed lever to a lower speed position and the car immediately slows down to that speed, the excess of momentum being utilized in recharging the battery, until the speed of the car has dropped to the point for which the speed lever is set.

Cutting out field resistance decreases the speed at which the recharging takes place, and cutting in resistance increases the speed, and as these operations are effected by the control lever the speed may be decreased by moving the lever in one direction either when running up or down hill.

When the speed lever is set in a position to drive the car at a given speed on a level road, this same speed is maintained either up or down hill without changing the position of the speed lever.

To obtain reverse motion a small knob located on top of the steering post is raised which reverses the field, and reverse speed is then regulated by a small control lever which regulates forward speeds.

The mechanical construction of the car is interesting. The frame is made of pressed steel channel section, reinforced at angles. The front spring is semi-elliptic, 39 inches by 2 inches, seven leaves. The rear spring is 48 inches by 2.5 inches—nine leaf cantilever construction. The wheels are 34-inch selected second growth hickory, mounted on Timken roller bearings. The front axle is a Timken Detroit of drop-forged I-beam section. The rear axle is a Timken Detroit full floating, with hellicle bevel gear, noiseless and free-running. There are two sets of brakes—internal expanding and external contracting. In addition to this the motor brake is wound for 85 volts, 35 amperes, and is of special slow-speed construction with 400 per cent overload capacity. It is inclosed in a dust, oil and waterproof housing. Integral with the rear axle, and is mounted on a three-point suspension with forward support of the ball and socket type to compensate for uneven road conditions and to relieve tortional strains.

The drive is direct from the motor shaft to rear axle, all working parts running in oil.

The standard battery equipment consists of 42 cells 15 plate Philadelphia battery, of 140 ampere-hours capacity. The battery equipment will be installed at the option of the buyer.

The seating arrangements provide five individual seats—the two revolving seats in front permitting occupants to face forward or back toward the driver. The rear seat is divided into three individual sections, the driver occupying the center section.

Electric Vehicle Association of America.

The New York Section of the Electric Vehicle Association of America was organized on August 26. Harvey Robinson, New York Edison Company, was elected chairman; D. C. Fenner, General Vehicle Company, vice-chairman, and David F. Tobias, United Electric Light & Power Company, secretary. The Executive Committee is composed of W. C. Andrews, Edison Storage Battery Company; T. C. Martin, secretary of the National Electric Light Association; S. W. Menefee, Anderson Electric Car Company; Nathaniel Platt, Baker Motor Vehicle Company; F. F. Sampson, Exide Battery Depots, Incorporated; Frank W. Smith, United Electric Light & Power Company; S. G. Thompson, Public Service Electric Company of New Jersey; Charles A. Ward, Ward Motor Vehicle Company; C. Y. Kenworthy, Rauch & Lang Carriage Company.

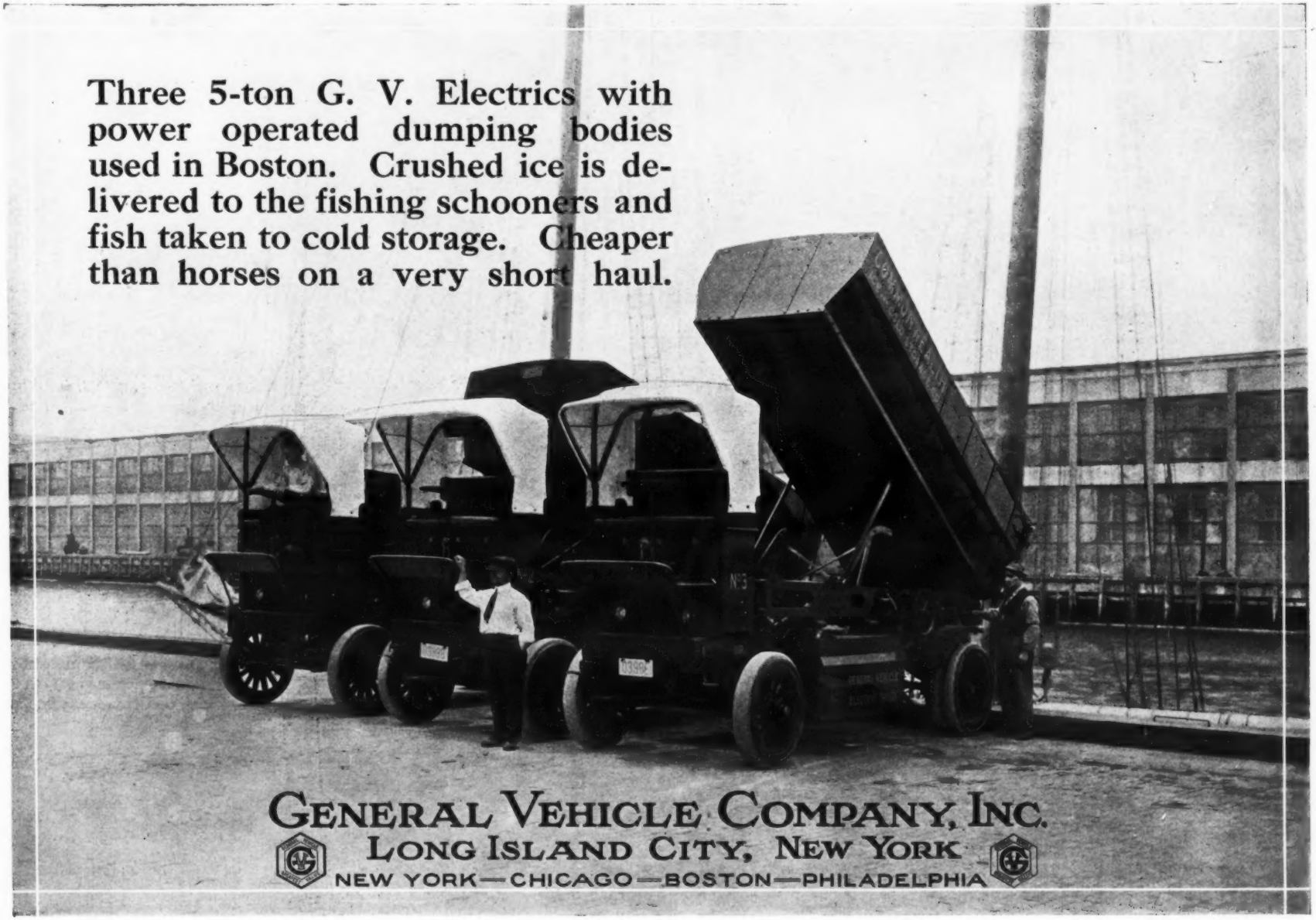
The secretary of the Electric Vehicle Association of America announces the present membership at 871, 38 applications for membership having been approved and accepted at the last meeting of the Executive Committee.

An organization meeting of the Detroit Section was held on July 17, and the following officers were elected: J. W. Brennen, chairman; W. J. Gordon, vice-chairman; H. C. Smith, secretary; Executive Committee, Miss Sarah M. Sheridan, C. W. Terry, H. C. Smith, A. C. Downing, W. H. Conant, W. J. Gordon, J. C. Ayers.

Simplex Foot-Warmer Rugs.

Among the accessories developed to increase the comfort and enjoyment of automobiling is the Simplex foot-warmer rugs, designed for use in electric passenger vehicles, manufactured by the Simplex Electric Heating Company, of Cambridge, Mass. This rug is a warm floor covering in the shape of a Wilton carpet rug measuring 15 by 27 inches. When connected to any convenient lamp socket it is heated to a suitable temperature to keep the feet warm. It is stated that the current required is almost negligible and because of its substantial construction the rug may be walked on indefinately without chance of injury. It is also stated that the heater will outwear the carpet, which gives an indication of the durability of the heating elements used.

Three 5-ton G. V. Electrics with power operated dumping bodies used in Boston. Crushed ice is delivered to the fishing schooners and fish taken to cold storage. Cheaper than horses on a very short haul.



GENERAL VEHICLE COMPANY, INC.
LONG ISLAND CITY, NEW YORK
NEW YORK—CHICAGO—BOSTON—PHILADELPHIA

Anderson Charging Plugs and Receptacles.

The Albert & J. M. Anderson Manufacturing Company, Boston, Mass., has developed a very interesting line of charging plugs and receptacles for electric vehicle service. Illustrations herewith show the type "N" charging receptable for both pleasure and commercial-vehicle service, and for both small and large garage service.

The type "N" double-pole charging receptacle is made for 50 and 150 amperes, 125 volts. The receptacle proper is a seamless drawn-steel shell forming the housing for the current-carrying parts, which are insulated and held secure in place by a non-conducting compound of great heat-resisting properties. The steel shell of the receptacle forms a supporting bearing for the plug, thus taking all mechanical strain away from the contact parts. Both the receptacle and plug are equipped with terminal lugs of unusual design and are attached to the contacts by means of screws permitting easy detachment when making soldered connections. Fig. 1 shows charging receptacle with an iron vehicle clamp mounting with a spring lid.

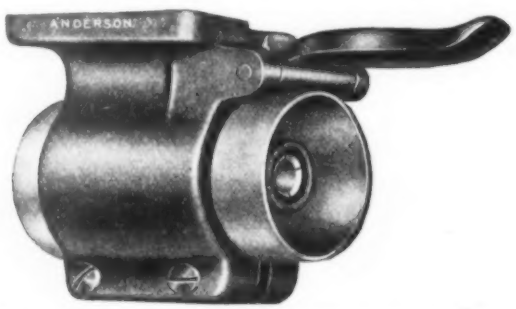


Fig. 1.—The Anderson Charging Receptacle with Vehicle-Clamp Mounting.

Fig. 2.—Anderson Charging Receptacle with Ball and Socket Mounting for Garages.

Fig. 2 shows a ball and socket mounting for service in garages and charging stations. With this mounting the free movement of the joint allows the receptacle to aline itself with the plug and attached cable, and should the vehicle through any carelessness of the operator be started before disconnecting, the plug would be pulled out on a straight line without injury.

Fig. 3 shows the double-pole charging plug. The plug, like the receptacle of the same type, has a steel shell which fits closely into the cylinderical shell of the receptacle. Long supporting surface is provided, which takes all mechanical strain away from the current-carrying parts. It is equipped with a special cable clamp for preventing abrasion of the insulation of the cable, and the clamp also takes the mechanical strain from the soldered joints at the terminals.

The plug and the receptacle have been designed in accordance with the recommendations of the Electric Vehicle Association of America, and they have been adopted by many companies operating fleets of electric vehicles and maintaining garages. Garage men in particular have appreciated the standardizing of this plug and receptacle and have adopted it in large numbers.

Fig. 3.—Anderson Charging Plug.

Gould Storage Batteries.

The Gould Storage Battery Company, New York, N. Y., is calling attention to a number of unusual performances of storage batteries in service in various parts of the country. A prospective passenger-car user in Pittsburgh required an electric car that could travel 50 miles with four passengers and then on the same charge climb a 17-per cent grade 250 feet long to his house and garage. Other conditions also severe were specified. A Gould battery was provided. Four passengers were carried over the specified 50 miles up the steep grade and into the garage. The car was then taken out again without additional charging and was operated to a total of 78.9 miles. Service being given by Gould batteries in handling freight and baggage at railroad terminals and in special and ordinary uses are described in a booklet which the company has recently issued, entitled, "What Gould Vehicle Batteries Are Doing."

An interesting performance of Gould storage batteries is in the construction of the new Catskill aqueduct under New York City. Ten storage-battery locomotives are used in this work, each being capable of pulling four cars fully loaded with broken stone, making a total weight for the whole train of about 15 tons. During the concreting in this work one locomotive on one charge transported 231 cars in four-car trains carrying 0.75 yard of concrete per car, the distance between shafting and forms being 1,200 feet. Two locomotives working under common conditions handled an average of 21 cars of concrete per hour over a 1,800-foot run for eight hours at a time.

Such performances, the company states, should enable one to closely estimate the capabilities of Gould vehicle battery-driven trucks in transporting ordinary merchandise, bulk material, etc.

Lubricant for Electric Vehicles.

The New York & New Jersey Lubricant Company, 165 Broadway, New York, is manufacturing a non-fluid oil which is specially recommended for use by electric-vehicle operators because of its ability to check friction and thus minimize wear and tear. It is stated by the manufacturer that tests on cars provided with non-fluid oil showes that the amount of power consumed per car mile is greatly reduced.

The non-fluid oil is manufactured in two grades; one recommended for ball and roller bearings and one for use in axils and grease cups.

The number of congresses and conventions that are to meet at San Francisco, Cal., during the Panama-Pacific International Exposition now totals 235.

Type "N" Charging Receptacle with iron vehicle mounting.

ANDERSON

CHARGING PLUGS AND RECEPTACLES

TYPE "N"

Included in the List of Approved Fittings

A thoroughly trustworthy and serviceable line, rapidly being adopted as standard by electric vehicle manufacturers and garage owners. Simplicity and a small number of parts distinguish the line; it is also practically fool-proof, provision being made to guard against the reversing of polarity, and, as in the Type "N" Ball and Socket Joint Charging Receptacle illustrated below, the carelessness of an operator who starts a vehicle before removing the plug from the receptacle cannot cause damage to plug, receptacle or cable.

Bulletin No. 29 fully describes the line. Write for a copy to-day

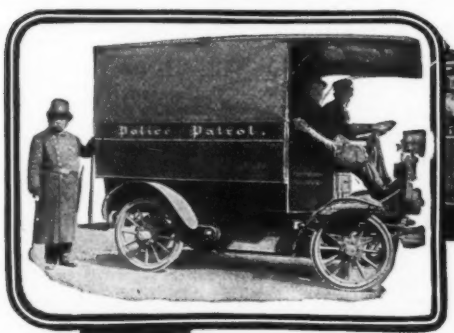
Type "N" Charging Receptacle with ball and socket mounting for garages and charging stations. Plug will pull out without injury if vehicle is started before disconnecting.

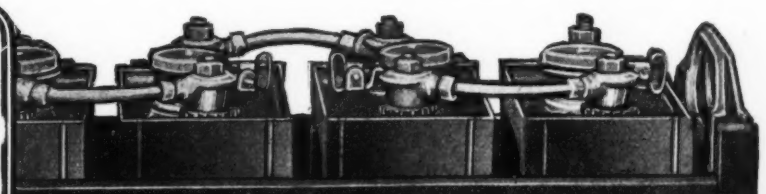
Charging Plug Type "N" especially designed to prevent strain on current carrying parts

Albert & J. M. Anderson Mfg. Co.

Factory and Main Office: 289-293 A Street, Boston, Mass.

New York, 135 Broadway Chicago, 105 S. Dearborn St.
Philadelphia, 429 Real Estate Trust Building
London, 48 Milton Street





18,529 Miles a Year

and Less Than $1 per month Battery Maintenance. From Service Report, Year Ending December, 1913, on Edison Battery—Detroit Electric Police Patrol Wagon operated by City of Memphis, Tenn.

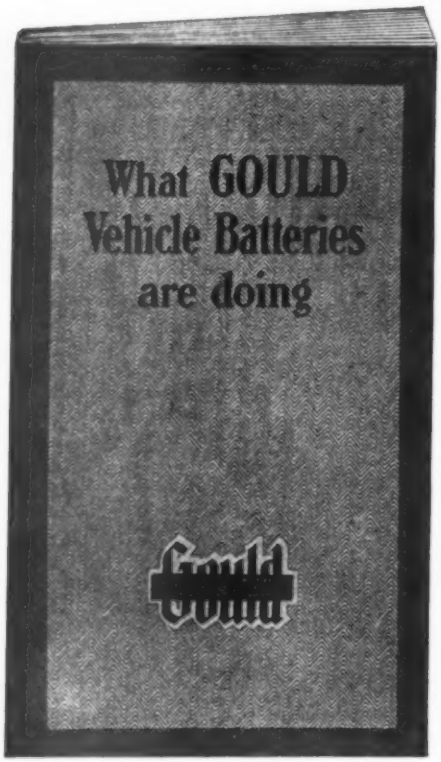
Number of Runs	5,166
Number of Miles	18,529
Cost of Tires, Chains, Grease, etc	$275.30
Cost of Battery Solution (Total Battery Maintenance)	*11.92*
Total Maintenance	$287.22

The Edison Alkaline Storage Battery in this kind of Service is guaranteed to be capable of developing **100 per cent** of its rated capacity at the end of **four** years.

Send us the name of your Commissioner of Fire and Police.

Edison Storage Battery Co., 105 Lakeside Ave. ORANGE, N. J.

Chicago Office: 2025 Michigan Avenue



Get this Booklet

The actual performance records cited therein form a good basis for judging whether a given battery is carrying as heavy loads, making as long runs and lasting as well as it should.

A careful reading should therefore prove instructive and probably of actual money value to all using or selling electric pleasure or commercial vehicle batteries.

Ask for your copy and if in the market for battery renewals, let us tell you exactly what service improvements a Gould Battery would accomplish in your own case.

Gould renewals fit any jars.

Gould Storage Battery Co.

GENERAL OFFICES: 30 E. 42nd ST., NEW YORK CITY
WORKS: DEPEW, NEW YORK

BOSTON: 14-16 Cambria St.
PHILADELPHIA: 613 Betz Bldg.
CLEVELAND: 1761-5 E. 18th St.
DETROIT: 88 E. Congress St.
CHICAGO: 225 E. 22nd St.
SAN FRANCISCO: 1448 Van Ness Ave.
LOS ANGELES: 110 E. Pico St.

Agents In: Washington, Rochester, Buffalo, Pittsburgh, Milwaukee, Minneapolis, St. Louis, Kansas City, Omaha, Denver, Topeka, Seattle.

Canadian Representative: R. E. T. PRINGLE
Toronto Montreal Winnipeg Vancouver 118

Books on Electric Vehicles

"The Electric Vehicle Hand-Book"

By H. C. Cushing, Jr. and Frank W. Smith

Fellow Am. Inst. Elec. Engrs. Publisher of "The Central Station," the official organ of the Electric Vehicle Association of America.

President Electric Vehicle Association of America and Vice Pres. United Electric Light & Power Co., New York.

362 Pages, Fully Illustrated, Flexible Leather Cover, Pocket Size. **Price, $2.00.**

CHAPTERS

I.—Electric Vehicle Development. By William P. Kennedy, Consulting Transportation Engineer.
II.—Lead Storage Batteries; Descriptive Lead Batteries; Charge and Discharge Rates; Care of Storage Batteries.
III.—Care of Lead Storage Batteries; Assembling and Putting New Batteries into Condition; Charging; Charging Overnight; Emergency Charging; Inspection; Electrolyte; Cadmium Readings; Lead Burning.
IV.—Commercial Types of Lead Storage Batteries.
V.—Alkaline Storage Batteries; Description and Care.
VI.—Charging Apparatus and Charging Stations; Alternating Current Apparatus; Isolated Plants.
VII.—Measuring Instruments, Electrical and Mechanical.
VIII.—Wheels, Rims and Tires; Their Care.
IX.—The Motor Construction and Care.
X.—The Controller, Construction and Care.
XI.—The Chassis, Its Components, Their Upkeep.
XII.—Association and Publications Identified With the Development of the Electric Vehicle.
XIII.—Comparative Cost Data.

The Automobile Hand-Book

By L. ELLIOTT BROOKES, Assisted by Other Well-Known Experts

Revised and Enlarged 1911 Edition. 16mo, over 650 Pages and over 320 Illustrations. Full Leather Limp, Round Corners, Red Edges. Price $2.00.

The automobile hand book is a work of practical information for the use of owners, operators and automobile mechanics, giving full and concise information on all questions relating to the construction, care and operation of gasoline and electric automobiles, including road troubles, motor troubles, carbureter troubles, ignition troubles, battery troubles, clutch troubles, starting troubles. With numerous tables, useful rules and formulas, wiring diagrams and over 320 illustrations.

Power transmission is thoroughly discussed, and the various systems of transmitting the power from the motor to the driving axle are analyzed and compared.

The perusal of this work for a few minutes when troubles occur, will often not only save time, money, and worry, but give greater confidence in the car, with regard to its going qualities on the road, when properly and intelligently cared for.

This is a brand new book from cover to cover—1911 Edition—and must not be confounded with any former editions of this popular work.

PRACTICAL AUTOMOBILE DICTIONARY. By S. KRAUSZ

English-French-German; French-English-German; German-French-English. With an introduction by C. J. Glidden. Twelve thousand technical terms and other words employed in connection with motor cars and motoring. For use in office, factory, repair shop and touring in foreign countries. 16mo. Leather. 129 pp. Price $2.00.

SELF-PROPELLED VEHICLES. By JAMES E. HOMANS

A practical treatise on the theory, construction, operation, care, and management of all forms of automobiles. Seventh Edition, revised. 500 illustrations. 6x9. Cloth. 667 pp. Price $2.00.

The various theories and problems involved in the construction and operation of the prevailing types of motor road carriages have been stated as clearly as possible, in order that the involved situations may be readily comprehended by all readers. The fundamental principles of the several types of motor, particularly of the gasoline engine, which is the least understood of all, have been treated at considerable length, in order that the facts may be thoroughly comprehended in their new relations.

THE AUTOMOBILE. By P. N. HASLUCK

A practical treatise on the construction of modern motor-cars, steam, petrol, electric and petrol-electric. Three volumes. Special Edition, enlarged. 1,200 illustrations. 8vo. Cloth. 1,300 pp. Price $10.00.

A very handsome set of instructive books brought up to date in the third volume containing many elaborate illustrations of cars now in use.

Electrical Review and Western Electrician

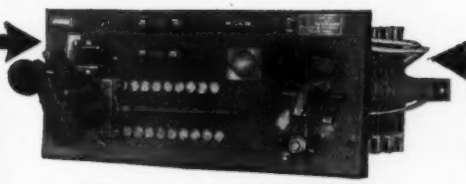
Western Headquarters for Electrical Books

608 S. Dearborn St.
CHICAGO

CUTLER-HAMMER

Provide for Future Growth

The latest development of the Cutler-Hammer engineers—the Unit Type Battery Charging Rheostats, can be assembled like a sectional bookcase. Whether you install a big outfit or a few rheostats at a time, the final result will be the same.



EACH SECTION A COMPLETE UNIT

Each charging rheostat with its resistance is a complete, easily handled unit, 24 in. wide, 10 in. high and 20 in. deep. New sections can be added as easily as sections of a sectional bookcase.

Six Unit Type charging sections mounted on standard frame.

New Universal Unit Type Battery Charging Equipment

(The Sectional Bookcase Idea)

meets the requirements of the small and large garage alike. Any number of single charging units up to six can be mounted on a standard frame. Any number of frames can be mounted side by side.

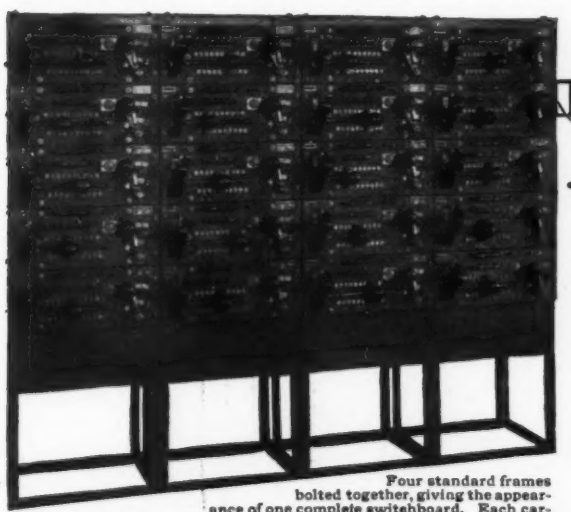
Rheostats or frames can be added like sections of a sectional bookcase. Everything is standardized and every convenience—every safeguard—is provided.

The rheostats are all within easy reach for operation without rods. They can be installed easily and quickly, and the connection arrangements on the back are very simple.

All readings may be taken without opening the charging circuit.

There is no chance of error in operating the wrong rheostat as the sliding handle is adjacent to the controlling switch of the rheostat and each unit rheostat is complete in itself.

The result of our long experience in the design of charging rheostats is expressed in this new unit type charging equipment.



Four standard frames bolted together, giving the appearance of one complete switchboard. Each carries five charging sections mounted with a blank space for another at the bottom.

Additions Easily Made

A charging outfit of several panels may be installed at one time or during the course of several years. The result will be the same. You will have a uniform equipment installed in the smallest possible space.

Whether you need battery charging equipment now or not, you should have a copy of Bulletin 8530 which describes and illustrates this new Universal Unit Type Charging Equipment, the latest development of the Cutler-Hammer engineers.

THE CUTLER-HAMMER MFG. CO. MILWAUKEE

NEW YORK: 50 Church Street CHICAGO: Peoples Gas Bldg. PITTSBURG: Farmers' Bank Bldg. BOSTON: Columbian Life Bldg.
PHILADELPHIA: 1201 Chestnut Street CLEVELAND: Schofield Building CINCINNATI: Fourth Nat'l Bank Bldg.
PACIFIC COAST AGENT: H. B. Squires Co., 579 Howard St., SAN FRANCISCO, San Fernando Bldg., LOS ANGELES and Morgan Building, PORTLAND, ORE.

Benjamin Electric Vehicle Horn.

The Benjamin Electric Manufacturing Company, Chicago, is placing on the market an electric warning signal designed especially for use on electric vehicles where voltages of 40, 60 and 80 are used.

The movement of this electric horn is of the vibrating type, but is especially designed, and embodies entirely new principles as to shape of magnet, mounting, etc.

The magnet itself is laminated. Its pole face is milled to an angle so as to expose as large a portion as possible to the magnet armature. The armature is so suspended that an extremely large portion of the magnetic energy is utilized. The windings of the magnet are treated with sterling varnish and the horn itself is absolutely water and dust-proof. This is absolutely essential as the voltages used are high, and the method of mounting a warning signal on an electric vehicle usually places it in a position where it is subject to a great deal of moisture.

The material used in this horn is of the highest grade, and the Company goes so far as to guarantee it absolutely for five years. The tone of the horn has quality. It is smooth, at the same time of great volume.

Lubrication as a Factor in Vehicle Operation.

Perfect lubrication is as essential to the electric car as it is to the gasoline car, and it has been determined by many users that the Acheson lubricants, Oildag and Gredag, assist to economical operation and high efficiency, their tendency being to decrease the consumption of electricity, and increase the life of the car. By decreasing the wear on all moving parts, the life of the car is lengthened and the consumption of electricity to overcome friction is reduced to a minimum. Thus more miles are obtained from a charge. Oildag is deflocculated graphite diffused in oil, the graphite being finer than the dust in the atmosphere, while Gredag is the only grease that contains pure, gritless Acheson graphite. These lubricants are manufactured by the International Acheson Graphite Company Niagara Falls, N. Y.

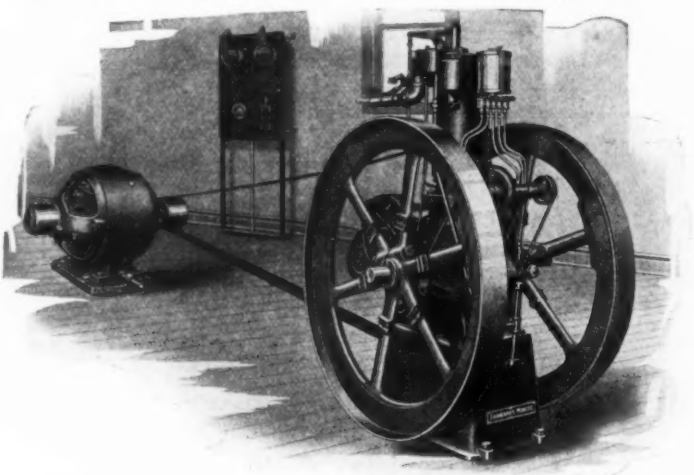
Howard Miniature Lamps.

In order that additional lamps for automobile lighting may be carried on the car in case of burnouts or breakage, the Howard Miniature Lamp Company, Ampere, N. J., has placed on the market a lamp chest provided with compartments for conveniently carrying the usual equipment of lamps without danger of breakage. The chest is of double construction, the outer case being an extra heavy cardboard cover bound with tough backbinders cloth. The inner case is made of heavy cardboard divided into sections for each lamp and stoutly reinforced. It is fitted with a close-fitting lid with printed subdivisions stating the exact use of the lamp in each compartment.

The lamps are individually wrapped in heavy cottonbatting and there is no possibility of breakage. The outer label of the chest is printed in blank, permitting the correct listing of the contents of the chest in accordance with the requirements of each car using this equipment. The regular assortment supplied ordinarily in these chests includes two 15-candlepower head lamps; two four-candlepower side lamps; one two-candlepower tail lamp and one one-candlepower speedometer lamp. These are standard Mazda lamps and are equipped with any style base.

Private Charging Equipment.

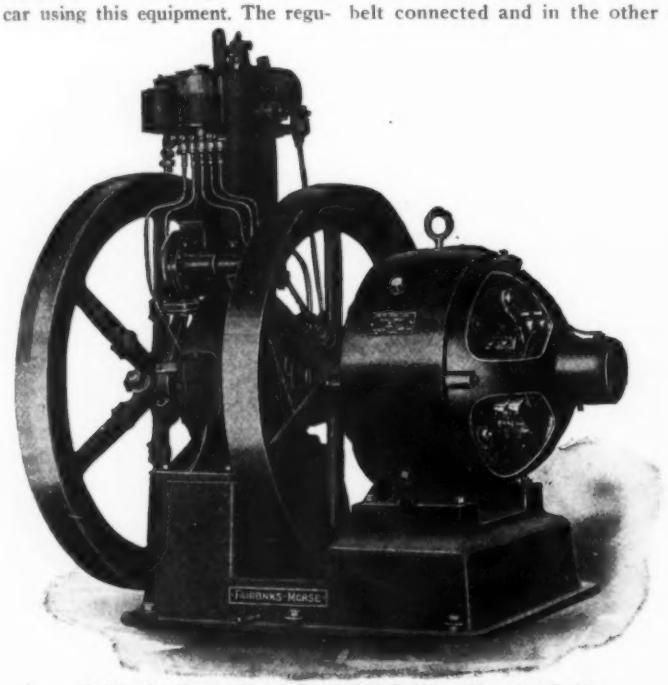
For charging electric vehicle batteries in the suburbs or in localities where central-station energy is not available, the generating plants manufactured by Fairbanks, Morse & Company, Chicago, have been found satisfactory and economical.



Fairbanks-Morse Belt-Connected Outfit for Battery Charging Service.

The two illustrations show a four-horsepower special oil engine driving a Fairbanks-Morse direct-current 115-volt 2.5-kilowatt generator, in one case belt connected and in the other direct-connected. These outfits are supplied with or without switchboard.

In some instances the engine when not used for running the generator is employed to supply power for miscellaneous purposes, belt connection being easily made.



Fairbanks-Morse Direct-Connected Battery Charging Outfit.